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SHORT COMMUNICATION

ACTIVITIES AND ACHIEVEMENTS OF THE BEEKEEPING DEVELOPMENT CENTER (BDC), BHANDARA, NEPAL: PROMOTION, TRAINING AND GENETIC IMPROVEMENT OF HONEYBEE

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ABSTRACT

Beekeeping is an ancient practices in Nepal, now commercially rears *Apis mellifera* and *Apis cerana* for honey production and bee related products like beewax, propolis, pollen and royal jelly. Beekeeping of Nepal is especially centered in honey production rather than exploration of other high value hive products. Beekeeping Development Center (BDC), Bhandara, Chitwan is a governmental organization under the Ministry of Agriculture and Livestock Development of Bagamati Province, Nepal, has the mandate to promote and develop beekeeping sector within this province. It has implemented a number of programs and activities to boost honey production and productivity, bee colony health, and management practices. This article documents the major activities carried out by BDC using a review based approach. The main activities of BDC in different fiscal year include Mite and European Foulbrood (EFB) management programs, which helps the beekeepers in pest and disease identification and control measures using biological, botanical, and chemical methods. This center works on larval grafting for quality queen production and distribute 1400-1600 queens annually. Similarly, it conducts quality queen production training program of 21 days for professional beekeepers. Furthermore, it raises awareness about safe pesticide use and promotes sustainable beekeeping practices. Recently BDC preform the instrumental insemination program for *Apis mellifera,* expected to improve the genetic quality of exotic honey bee. Overall, BDC plays a vital role in improving honeybee colony performance and expanding beekeeping in Bagamati Province of Nepal.

KEYWORDS

Beekeeping, Honeybee, Larval grafting, Instrumental insemination, Mite and EFB management

1. INTRODUCTION

The beekeeping is a promising agro-enterprise in Nepal which enhances rural livelihoods, biodiversity conservation and increase the agricultural productivity through pollination services (Kafle and Tiwari, 2024; Devkota et al, 2021; Devkota, 2020). It has been in practice from an ancient time in Nepal (Aryal et al., 2015). There are mainly two governmental organizations working in the beekeeping sector in Nepal; one is Beekeeping Development Center (BDC), Chitwan under the Ministry of Agriculture and Livestock Development of Bagamati Province and another Apiculture Development Center (ADC), Godawari of federal government. About the history of BDC office, it was found that the care and conservation of local honeybee colonies in the hives located in the wall cavities of Gokarna and Nagarjun Royal National Parks were first initiated under the Department of Wildlife Conservation. Later in 1981, Russian style box hives were introduced. In 1984 the Ministry of Finance allocated a budget for technical supervision and management and from 1985 technical programs were launched under the name Royal National Park Beekeeping Project as the part of the Commercial Entomology Project. Afterward, in 1996 the project was renamed Royal National Park Beekeeping Office, Gokarna with the mandate to conserve, develop and expand *Apis cerana* bees. Then, the office was brought under the Department of Agriculture for management and as per the decision of the Secretary level meeting on July 2007, the office was temporarily relocated from Gokarna to Godawari.

Based on site visit of various locations, the premises of the Kimbu Nursery Management Center in Bhandara, Chitwan, were considered appropriate for permanent relocation. Accordingly, as the decision of the Council of Ministers on January 2010, the office was permanently shifted from Godawari to Chitwan with the name Beekeeping Development Center. Since then, the office has mandate to conserve, develop and expand *Apis mellifera* bees in the terai and inner terai regions. Now, BDC performed number of activities for the promotion and expansion of *Apis mellifera* beekeeping in terai region and *Apis cerana* beekeeping in mid-hill region of Bagamati Province, Nepal. This article seeks to document the range of activities carried out by the BDC in Nepal.

2. METHODOLOGY

This article was based on a review approach and collecting the information from different published material of governmental organizations and documenting the activities carried out by the BDC, Bhandara, Chitwan. It compiles information from different fiscal years to highlight the major programs and initiatives undertaken by the center. Similarly, checklist was prepared to assess the different methods adopted by beekeepers learned from BDC, Chitwan.

3. RESULTS

The beekeeping related activities carried out by the BDC were documented, which cover various programs, trainings, and initiatives implemented in different fiscal years and discussed below in different heading.

3.1 Mite management program

This program is conducted in the areas where the sign of mite infestation was found and one-day training session is conducted for beekeepers. During the training day beekeepers are taught about the identification of mites, the symptoms of mite infestation, and appropriate management practices to control the spread of mites. At training session different biological and botanical methods for controlling mite infestation are

emphasized like the use of *Azadirachta indica* (neem), curry leaf plants, extracts of holy basil, and the leaves and roots of sweet flag (*Bojho*). Furthermore, formic acid (2 ml per frame three times in case of *Apis mellifera* and 1 ml per frame three times in case of *Apis cerana*) and Apistan (one strip per hive in case of *Apis mellifera* and half strip per hive in case of *Apis cerana*) are recommended for managing mite infestations in their apiary. From the study of 60 respondents it was found that majority of beekeepers (52) used formic acid to control mites in *Apis mellifera* followed by both (41) (Use of formic acid and apistan alternatively) in program implemented beekeeping area.

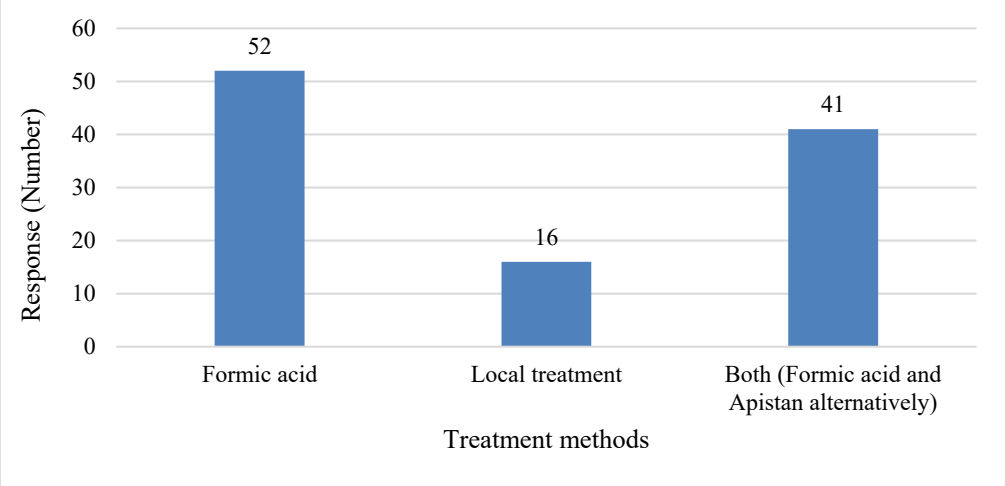

Figure 1: Different methods to control mites in *Apis mellifera* by beekeepers

3.2 European Foul Brood (EFB) management program

This program is implemented in areas where bee colonies are suspected with European Foulbrood (EFB) disease. BDC organizes one-day EFB management program for local beekeepers, where beekeepers learn how to identify EFB disease and know the key signs of the disease. The program focuses on effective management practices to minimize the spread of infection. Beekeepers are advised to regularly replace old combs and queens, maintaining colony hygiene and ensuring colony strength to reduce the risk of EFB disease. In some cases, beekeepers may also use antibiotics for managing the disease but during the treatment beekeepers didn't harvest honey.

3.3 Larval grafting technique for quality queen production

The BDC performs the larval grafting technique to produce quality queen bees where mother colonies and drone colonies were selected across the country. A systematic record-keeping system is followed in center to identify and maintained the best-performing colonies require for larval grafting. In Chitwan, where we found sub-tropical climate, March to May is considered the most suitable month for larval grafting. Then, the matted queens are distributed to beekeepers across Bagamati Province to support colony improvement and productivity. Each year, BDC produces around 1400-1600 grafted queens for distribution. This program plays a crucial role in enhancing honeybee's overall colony performance in the province and number of grafted queen produced by BDC in different year are presented in table 1.

Table 1: Number of grafted queen produced by BDC in different year

Year	Number of grafted queen produced and distributed to beekeepers by BDC
2020	1300
2021	1123
2022	1500
2023	1378
2024	1625

3.4 Training program to the beekeepers

The beneficiaries of this program are farmers who are interested in beekeeping as well as those who already engaged in rearing bee colonies. The training is organized for three to five days. Each year, the BDC conducts two to three such training sessions. During this training period the importance of beekeeping and its role, life cycle of bees, colonies management, use of artificial feed and management of diseases and pest of bees were taught. These programs aim to enhance the knowledge and skills of farmers in modern beekeeping practices.

3.5 Training on quality queen production (21 days)

This is an advanced beekeeping training program conducted solely by BDC or in coordination with Agriculture Training Center (ATC) of Bagamati Province. The training duration is 21 days and focuses for professional beekeepers. The beekeepers gain in-depth knowledge and practical skills in modern beekeeping techniques along with the technique of larval grafting for quality queen production. After completion of this training period, beekeepers are capable of producing grafted queens independently. It empowers beekeepers not only to produce queens for their own colonies uses but also to sell surplus queens to other beekeepers in their respective districts. This training program meaningfully contributes to improving the quality of bee colonies and enhancing income opportunities for professional beekeepers. The training on quality queen production in BDC or in co-ordination with ATC after federal system in Nepal was presented below;

Table 2: Training on quality queen production by BDC in different year

Training year	Number of participant	Professional beekeepers adopting larval grafting after training	Remarks
2020	20	6	Training conducted by BDC
2022	18	8	Training conducted by BDC
2024	18	6	Training conducted in co-ordination with ATC, Bagamati Province

3.6 Program on Awareness and Safe Use of Pesticides

Now a day, commercialization of agriculture led the haphazard use of pesticides, which has negative impacts on beekeeping. To address this issue, the BDC conducts awareness campaigns/program for farmers. This kind of programs give the information about the harmful effects of chemical pesticides on honeybees, human health and the environment to the farmers. During the interaction program, BDC distributes leaflet, pamphlet, flex etc which highlight the negative effects of pesticides and value of pollinators. This program helps to promote the use of alternative pest management practices that are safer for pollinators, reduces the pesticide related risks and supporting the sustainable beekeeping practices in the province. The learning by beekeepers and non-beekeepers were presented in figure below.

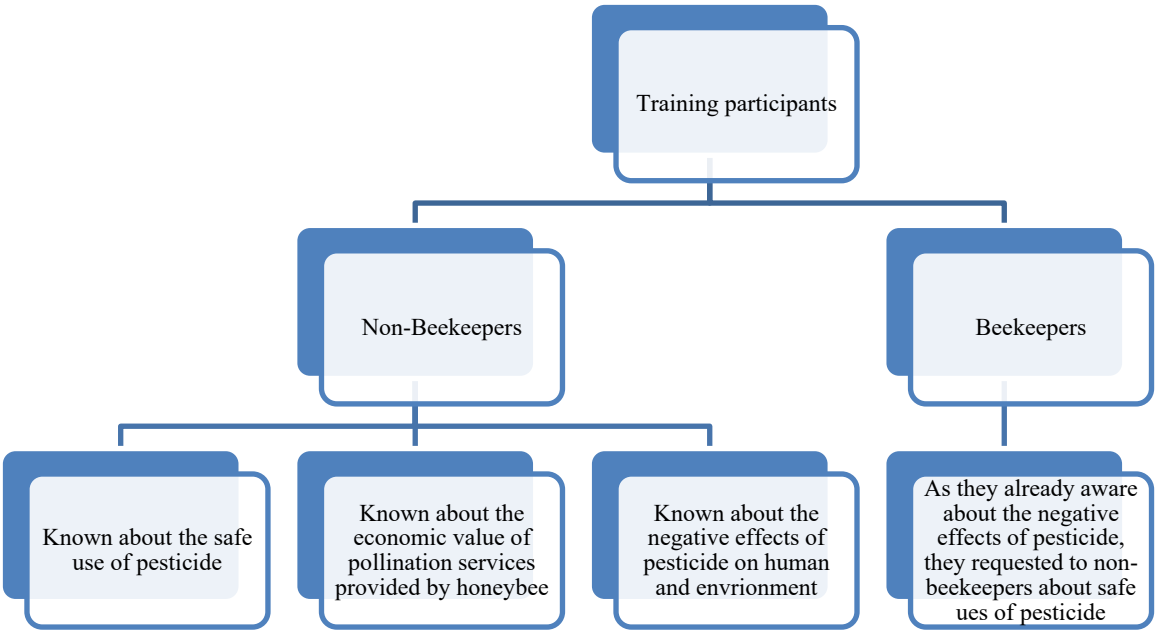

Figure 2: Participants learn from the pesticide use awareness program

3.7 Conduct Instrumental Insemination (I.I) program in *Apis mellifera*

The BDC has been starting an instrumental insemination (I.I.) program for *Apis mellifera* since 2023. By 2025, BDC successfully produced five I.I. queens. In this program, the superior quality mother colonies and drone colonies are selected across the country and brought to BDC Bhandara where best performing colonies are selected and maintained for instrumental insemination purposes. The center has its own I.I. laboratory and a team of skilled technical staff to carry out the I.I. program. At present, this initiative is one of the most recent and advanced activities undertaken by BDC Chitwan, which furthermore improves the genetic quality of honeybee colonies in Nepal in future.

4. Conclusion

The BDC, Bhandara, has played a vital role in promoting and expanding beekeeping sector in Bagamati Province of Nepal. Over the years, it has implemented a wide range of programs and activities targeting both *Apis cerana* in the mid-hills and *Apis mellifera* in the terai region. These programs include mite and EFB management, queen production through larval grafting and advanced training for professional beekeepers etc. BDC also focuses the program which raises awareness about the safe use of pesticides to protect honeybee populations. The center's initiatives in instrumental insemination is a noteworthy step in improving the genetic quality of honeybee colonies. Annual training programs and distribution of quality queens to the beekeepers have strengthened beekeeping practices and enhanced overall colony performance. The technical support provided by BDC has empowered farmers and professional beekeepers to adopt modern and sustainable beekeeping practices in Nepal.

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