*Int.J.Curr.Microbiol.App.Sci* (2018) *7*(4): 3049-3052

*International Journal of Current Microbiology and Applied Sciences*
***ISSN: 2319-7706* Volume 7 Number 04 (2018)**
Journal homepage: http://www.ijcmas.com

**Original Research Article** https://doi.org/10.20546/ijcmas.2018.704.345

# Role of Beekeeping Trainings in Integrated Farming System and Diagnosis of Beekeeping Problems in HK Area of Karnataka, India

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**Keywords**

Diagnosis, Technological problems, Insect pest, Diseases, Honey bees

**Article Info**

***Accepted:***
23 March 2018
***Available Online:***
10 April 2018

**A B S T R A C T**

Beekeeping is a forest and agro-based industry, which is beyond the ordinary realms of industry, in the sense that the humans derive benefits from interaction between two living things like plants and bees without affecting adversely both. On the contrary plants, including many crops, prosper with the abundance of bees (as pollinating agents) and the bees, sheltered both by nature and humans provide mainly honey and other by-products like beeswax, bee-pollen, propolis and royal jelly. Bee-keeping, systematically adopted as a supplement to farming, can bring prosperity to the villages with species diversity crops. The IFS Project helped many farmers to get knowledge on Honey bee cultivation and its importance. During the last 3 years *i.e.* from 2014 to 2016, a close relationship of Apiculture interested farmers was maintained in KVK, It was inferred that majority of the farmers enquired about management of wax moth, ant problem, varroa mite which reveals that these are the most important pests of honey bees and their products and cause serious losses in commercial beekeeping.

## Introduction

*Apis* of family Apidae is the main genus of honey bee accounting for bulk of honey production, and the genus *Trigona*, also from the same family, is a minor producer of honey. In Karnataka Uttara Kannada has three species of *Apis* viz. *A. dorsata dorsata, A. cerana indica,* and *A. florea* and one species *Trigona* (*T. irridipennis*). In the recent times these bee populations suffered decline in the Western Ghats due to many factors, the major ones being poor management practices, epidemics such as Thai sacbrood, Nosema, and Foulbrood disease and pests like black ants, Varroa mites. Predator insects like wasp, wax-moth and some insectivorous birds like bee eaters, drongoes, etc. are minor causes affecting bee populations. Bee keeping is a profitable enterprise that requires little investment. Punjab farmers have taken up bee keeping on a large scale. Punjab has the largest number of 3,00,000 colonies, followed by Haryana (10,500 colonies), Himachal Pradesh (50,000 colonies) and J & K (15,000 colonies). There are 30,000 bee keepers in Punjab and honey production in 14,000mt. A large number of factors affect honey bee and hence the production of honey like honey bee do not do well in coniferous forests, in deserts where there are long stretches of sand dunes, in heavy monsoon areas and in cropped areas

where insecticides are applied extensively by ground or aerial spraying. Similarly, a large number of insects act as enemies of the honey bee, but their attack is not serious in all cases. Some, like the wax moths and varroa mite, are extremely damaging and can cause absconding and death of a colony.

Wasps an hornet, near relatives of the honey bees, actively prey upon them and also rob them of their brood, depleting colony strength to such an extent that bee keeping cannot be practiced in the area of their abundance. As far as diseases are concerned, there are a number of serious diseases of immature stages and of adult honeybees.

Some are contagious caused by pathogens, others are non-contagious caused by physiological disorders or by poisons in the environment. The pathogens include viruses, bacteria, fungi, protozoa, mites etc. For the last so many years, every year, a large number of farmers visited KVK Bee keeping expert to have guidance on commercialization. It has been reported earlier that during different seasons in a year, number of farmers seeking technical guidance regarding agriculture and allied fields varied to a large extent (Kaur, 2016).

## Materials and Methods

The record of all the visiting farmers was maintained by the KVK, Plant protection scientist which complete details of the farmer with address and contact number was maintained. Similarly, the purpose of visiting KVK was recorded date wise by the KVK scientist and at the end of each month, a summary was prepared and analysed for severity of the attack of insect pest and diseases. The data were classified month wise and problem wise to note down the extent of damage caused by the insect pests, diseases or other agencies on honey bees. The samples were diagnosed using simple microscope, compound microscope and preparing slides of the diseased specimen to know the pathogen involved for diagnosis. Based on the results of the diagnosed specimen, the bee keepers were advised to follow the recommendations accordingly.

## Results and Discussion

### Insect pests of honey bees

The farmers who linked with whatsapp, phone contacts and personal contacts with queries pertaining to honey bees were documented, the seasonal or monthly activities like January, February, March, April, May, June, July, August, September, October, November and December problems and solutions were recorded. It was inferred that majority of the farmers enquired about management of ants, wax moth and mite which reveals that these are the most important pest of honey bees and their products and cause serious losses in commercial beekeeping (Table 1).

### Wax moth

Out of 20 farmers who visited the KVK with queries pertaining to the honey bees from January to December months, 20% per cent farmers enquired about management of wax moth which confirms that it is the most devastating pest of honey bees. Secondly, a constant number of farmers visited the KVK with queries pertaining to its management in every month of the year which again confirms its devastating nature and its activeness throughout the year. The farmers were advised to follow the prophylactic measures which are more effective in keeping an apiary free from this pestilence as controlling this pest inside a hive in active season is not so easy. The farmers were advised to keep the bee colony stronger as a stronger bee colony itself is able to manage this pest (Table 2).

**Table.1** The number of farmers trained and farmers' feedback on bee keeping

| Sl. No. | District | Remarks | | |
|---|---|---|---|---|
| | | Trainings | Farmers attended | Extension Gaps identified |
| 1 | Kalaburgi | 03 | 103 | Summer bee keeping management techniques<br>Maintainace of bee box and colony acquire technique |
| 2 | Raichur | 05 | 154 | Cost of production and maintainace<br>Subsidy availability in Horticulture department |
| 3 | Yadgiri | 02 | 46 | Best crop choices and Bee species knowledge**,** Guidance |
| 4 | Koppal | 05 | 186 | Equipment availability, pollination benefits, marketing links knowledge |
| 5 | Bidar | 01 | 34 | Basic Training, specific crops<br>Marketing knowledge |
| 6 | Ballari | 02 | 87 | Commercial cultivation Technical support |
| **Total trainings** | | 18 | 610 | Bee keeping knowledge |

**Table.2** Nector, pollen availability seasonal management and yield details of bee keeping

| Sl No | Area | No of farmers practicing | Yield per box per year | Crops and nector, pollen, flower availability month |
|---|---|---|---|---|
| 1 | Kalaburgi | 05 | 10.5 kg | Mango: Janu-March<br>Redgram, Sunflower: Kharif and Rabi<br>Drumstick: Feb to Nov<br>Weed flora |
| 2 | Raichur | 07 | 9.85 kg | *Prosophis julifera*: Rabi and summer<br>Weed flora, Mango: Summer Sapota, Lemon, Sunflower: Rabi and summer |
| 3 | Yadgiri | 02 | 7.35 kg | Sunflower, Groundnut,<br>Safflower: Kharif and Rabi<br>Sapota, Mango: summer |
| 4 | Koppal | 28 | 11.23 kg | Cucurbits: Rabi and Summer<br>Lemon: Summer<br>Mango: Feb-April<br>Neem: Summer |
| 5 | Bidar | 04 | 8.62 kg | Mango, Sesamum, Shrubs and weed flora |
| 6 | Ballari | 06 | 10.15 kg | Weed flora, Oil seeds, Banana, Fig, Mango |

The farmers were also advised to keep the bottom board clean and burn the collected debris from the bottom board as a large number of eggs are laid by the moth on bee wax or in debris on the bottom board, to keep cracks and crevices in the hive plugged and to remove extra empty combs from the colony

## Management of honey during different seasons

The next very problem, about which the bee keepers enquired the most, was the management of honey bees in different seasons. There are five different seasons in Punjab and

management practices are usually different, except some, during different seasons. Few farmers enquired about the management of honey bees in the winter and spring seasons each whereas low per cent farmers asked about management of honey bees in the summer season. The beekeepers asked about the general management practices during the different seasons and no critical problem had been faced by the beekeepers during the respective season.

As most of the bee keepers were well aware of the type of bee behavior which the bees generally show when escaping takes place and they have also included providing the supplementary sugar: water feeding during the lean period in their management practice, hence it may be the reason that very less number of bee keepers asked about the management of this problem. One thing to note that the bee keepers who enquired about this problem were the beginners and small bee keepers who were unable to shift the colonies to places of abundant bee flora or were unaware to provide the supplementary sugar solution during the lean period. To get rid of this problem, the beginners were advised to provide sugar feeding in the evening, to make colonies bee proof, by plugging cracks and crevices and reducing the entrance to one-bee feeding and prevent spillage of feed in the apiary or outside the colonies. The Light honey is more valued than darker ones because of the general preference for clear honey with a mild taste. Single floral honey is more valued than mixed origin honey. Honey infused with various flavours, such as of ginger, vanilla and cinnamon is becoming increasingly popular.

The Beekeeping is a unique initiative tried by the SMS plant protection through help of Directorate of Research RKVY IFS, UAS Raichur and Krishi Vigyan Kendra by IFS project, Directorate of extension UAS Raichur for lining the farmers with the scientific knowledge and trainings on bee keeping. There is need for adopting innovative strategies and more importantly adopting multipronged initiative and timely diagnostic and management strategies to combat attack from pests and environmental stress to mitigate losses.

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**How to cite this article:**

Badari Prasad, P.R., B. Zaheer Ahamed and Meti, S.K. 2018. Role of Beekeeping Trainings in Integrated Farming System and Diagnosis of Beekeeping Problems in HK Area of Karnataka, India. *Int.J.Curr.Microbiol.App.Sci.* 7(04): 3049-3052.
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