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Beekeeping status in Kangra district of Himachal Pradesh

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Abstract
Beekeeping is a rural cottage industry having its connections with agriculture & horticulture. Due to the commercial importance of products obtained from beekeeping, it can contribute in the economy of state/nation but it requires a lot of improvement in beekeeping as well as in agricultural practices. Most of the beekeepers are facing problems due to lack of knowledge of bee management technology and related skills. This small cottage industry is still underdeveloped in Kangra district of Himachal Pradesh. Crop diversification which can provide continuous succession of blooming bee forage, awareness related to varroa mite and other bee diseases, guidance & consultancy to farmers/beekeepers by regional bee research and training centre is urgently required.

Keywords: Beekeeping, Kangra, Honeybee, Himachal Pradesh

1. Introduction
Beekeeping is the practice of keeping and managing honey bees, which contribute immensely to the welfare and economy of mankind. Success of this small cottage industry depends upon planned bee management technology. Honeybees not only provide honey, bees wax, royal jelly, propolis and bee venom which are useful products from medical and commercial point of view but also play a vital role in pollination of various fruits & crops. Bee management practices like assessment of dearth periods & providing supplementary feeding to bees are still not common and must be strengthened [3, 6]. Before establishing an apiary in a particular area, it is important to recognize the problems to be faced during and after the establishment of apiary [1, 2, 7, 9]. The present survey report reveals the problems being faced by beekeeping in Kangra district of Himachal Pradesh.

2. Material and Methods
The present study was carried out during October, 2015 to May, 2016 in Kangra district of Himachal Pradesh, which is situated in Western Himalayas between latitude $31^0$2-$32^0$5 N, longitude 75^0-75^0 45′ E. The elevation above the sea level of Kangra district is in the range of 427 to 6401 meters. The district is spread over 5,739 Sq. Kms. having about 216643 hectare of land, out of which 195738 hectare is under cultivation. In this district, river Beas flows through distance of 94.00 Kms. The soil characteristic is both sandy & loamy. The climate of district is pleasant around the year except in plains like Nurpur, Indora, Fatehpur areas where temperature may raise up to 40 ^{0}C in the month of May/June. Monsoon sets in the first week of July and continues till mid September. It is extremely cold in winter. Various agricultural crops, vegetables and fruits are grown in different parts of district Kangra. Agriculture forms the backbone of the district economy.
Questionnaires were prepared and data was collected according to standard method [9] from randomly selected beekeepers in the districts. Information regarding crop pattern, tree cover and meteorology was also collected from related departments.

3. Results and Discussions
3.1 Floral scarcity/Dearth period
It was surveyed that honeybees experience paucity of food in the month of May and June. Also in many apiaries, the strength of bee colonies was reduced to half which affects overall production of honey in blooming season. The crop rotation is such that from mid April to end of May, fields are empty. Farmers prepare soil for next crop.

Also there is no any fruit crop during this period except mango, which is not suitable food source for honeybees. Bee colonies have to be fed with supplementary food so that population of bee colonies can be maintained [6].

3.2 Burning of straw

Burning of straw causes environmental pollution & global warming. It was observed that despite of ban by government of Himachal, paddy and wheat straw are burnt in fields especially during summer season affect bee population as well as bee movements adversely. There occurs heavy mortality of bees. The conditions are more adverse during summer season when pollen and water sources are less.

Fig 1: Showing burning of straw in fields

3.3 Excessive use of chemicals in Agriculture

Kangra is agriculture oriented district. But pesticides, fungicides and weedicides etc., when applied to blooming crops causes severe damage to bees. Dead or dying bees were being seen at the entrances of bee colonies in various apiaries of this area, which indicates pesticide poisoning. Such poisoned bees showed uncoordinated movements, became paralytic and loose the power of orientation. Earlier owners of fruit orchids used to hive bee colonies so that to early and quality fruiting. But now beekeepers are not ready to shift their colonies to the fruit orchid because of heavy use of pesticides due to which there is huge mortality of bees.

3.4 Honeybee diseases, pests and enemies

Honeybees like all other creatures suffer from many diseases and are attacked by various parasites, pests, predators and enemies. During survey, it was observed that ectoparasitic mites, *Varroa jacobsoni* causes a severe damage in this district in last decade. Beekeepers also reported the presence of pests like lesser wax moths (*Achroia grisella*), Greater wax moth (*Galleria mellonella*) and Hawk moth (*Acherontia styx*). Losses due to wax moth (which is pest of all honeybees) were found very serious as they destroy raised combs in storage as well as in hives, particularly during and after monsoon when colony strength is low. Predators of bee like wasps (*vespa sp*), green bee eater birds (*Merops sp*) were also reported by few beekeepers.

3.5 Lack of management techniques

Proper management of apiaries can only be done if beekeepers have true understanding of habits of honeybees and maintaining colonies in changing seasons. Only those beekeepers will succeed who have an in depth knowledge of various phenomena associated with life of the honeybees like life cycle, swarming, robbing, absconding, queen rearing, queen introduction, joining of weak colonies etc. Suitable management at proper time is secret of success [2, 4, 5, 7]. Survey of apiaries of this district revealed that the most of beekeepers are lacking bee management techniques and skills and are not much aware.

3.6 Bee behavior, hives and beekeeping equipments

Only 20 per cent beekeepers have proper knowledge regarding queen introduction, laying workers, uniting colonies and cleaning bottom board. Practices like inner boards in hives, drone traps, queen cell protectors and pollen traps etc are not getting used anywhere in the district. Only very few percent beekeepers use queen excluders in supers which are necessary for increasing quantity and quality of honey.

3.7 Examination of colonies

Examination of hives at regular intervals is necessary to observe their condition and requirements; otherwise it may cause economic loss. Information collected from various apiaries of this district showed that usually inspection operations are hardly performed by beekeepers. Less than 20 per cent of beekeepers perform examination of colonies in proper way.

3.8 Bee Nutrition

During dearth period, sugar syrup and pollen substitute should be given to the bee colonies [3, 7]. But beekeepers of this area either migrate bee colonies or give only sugar syrup as supplementary feed. Survey revealed that pollen substitute is provided to the bee in the regional research centre (CSKHPKV, Palampur). But not even a single beekeeper is following this practice and not providing pollen substitute to bee colonies.

3.9 Hive Products

Survey revealed that most of the beekeepers know honeybees for honey. They have negligible knowledge regarding other hive products like royal jelly, propolis, bee venom, bees wax and pollen etc. Annual average honey production of this district was 8.15kg per colony which is quite low. Other products are not extracted by beekeepers. Efforts should be made to educate the beekeepers about the use & importance of all bee products.

3.10 No contact with regional research centre

There is one bee research station located at Nagrota Bagwan in this district to tackle problems like bee diseases and for working out bee management techniques. Survey revealed that officers of bee research station hardly provide any training to farmers/beekeepers. Scientific practices developed by the researchers & scientists are not getting transferred at farmers/beekeepers level.

3.11 Recommendations

Following recommendations are being made to develop beekeeping industry in Kangra district of Himachal Pradesh:-

- Organic farming must be encouraged & strengthened. Excessive use of pesticides, weedicides, fungicides should be avoided. Pesticides should be used in very optimum concentration. Pesticides should be applied in the evening when bees are not at work.
- Burning of the straw in fields must be banned strictly as it adversely affect bee population.
- Diversification of crops is urgently required, so that period of floral scarcity may be decreased. Area under tree cover (tree of bee interest) must be increased.

- Suitable supplementary feed/sugar syrup should be provided to bee colonies during dearth period and pollen substitute should be given at proper time.
- Regular inspection of apiary should be carried out to check swarming & absconding etc. Apiary area must be kept hygienic. There should be proper spacing between the colonies.
- Farmers should be made aware about benefits of apiculture and pollination. Beekeeping should be made an integral part of agricultural and horticultural techniques.
- Provision of extracting various hive products other than honey like royal jelly, propolis, bee venom and pollen must be done to make the beekeeping more profitable.
- Population of colonies must be kept strong as weak colonies can be attacked by various diseases and enemies like wax moth etc. Proper management techniques should be followed.
- Queens rearing techniques should be popularized. Surplus mated queens in small nuclei must be maintained.
- Regional Apicultural Research Centre should impart training to beekeepers & make them aware of profit of beekeeping venture.
- Government should pay more attention towards formulation of policies related to development & marketing of hive products.

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