

Status and Problems of Beekeeping in Mansa District of Punjab

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Abstract: Beekeeping as a village industry is of considerable importance but in study area it requires a lot of improvement in apicultural 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 may be called in infancy in Mansa district of Punjab. Crop diversification, which can provide continuous succession of blooming bee forage, is urgently required. There must be a regional bee research and training centre to provide guidelines against threats to beekeeping like varroa mite and other serious bee diseases.

Keywords: *Apis mellifera*, Beekeeping, Bee behaviour, pollination, Queen rearing.

I. Introduction

Honeybees not only play a vital role in pollination of various crops but also provide honey, bees wax, royal jelly, propolis and bee venom which are useful products from medical and commercial point of view. So beekeeping is the practice of keeping and manipulating honey bees, which contribute immensely to the welfare and economy of mankind. Success of this small cottage industry depends upon planned bee management technology. Before developing an infrastructure for beekeeping in a particular vicinity, it is important to recognize the problems to be faced during and after the establishment of bee keeping industry. The present report reveals the problems of beekeeping (*Apis mellifera*) in Mansa district of Punjab.

II. Study Area

The present research work was carried out in Mansa district of Punjab, which is situated at latitude $29^{\circ} 59' -00''$ N, longitude $75^{\circ} 24' -00''$ E and elevation above the sea level of Mansa city is 210 meter. The district is spread over 2174 sq. Kms. having about 216643 hectare of land, out of which 195738 hectare is under cultivation. It is an important part of cotton belt of Punjab and is therefore fondly called the "area of white gold". Agriculture forms the backbone of the district economy. In this district, river Ghaggar flows through distance of 15Kms. and Sirhind drain passes through the entire district and has its out fall in river Ghaggar. The soil characteristic is sandy. The climate of district is more or less typical of Punjab plains. It is extremely hot and dry in summer. Temperature goes up to 46°C in June. Monsoon sets in the first week of July and continues till mid September. It is extremely cold in winter.

III. Material And Methods

Detailed surveys have been made in the study area from year 2008 to 2011 to collect information regarding status and problems of bee keeping. (*Apis mellifera*) Questionnaires were prepared and data was collected according to standard method [1] from randomly selected beekeepers and their apiaries. Information regarding crop pattern, horticulture, tree cover and meteorology was collected from related departments of Punjab State.

IV. Result And Discussion

4.1 Lack of crop diversification

Continuous blooming forage is necessary for successful beekeeping, which is not possible without crop diversification. Dominating crop rotation in this area is cotton (*Gossypium sp.*) ----- wheat (*Triticum aestivum*) or paddy (*Oryza sativa*) ----- wheat (*Triticum aestivum*). On an average (from year 2008 to 2011) area under cotton, paddy and wheat was 86850, 70550 and 166412 hac respectively. This crop rotation is not very useful for beekeeping. However *Gossypium* is considered good source of nectar and pollen for bees but excessive use of pesticides on this crop increases mortality rate of honeybees. Introduction of B.T. Cotton has decreased the use of pesticides to great extent. Adverse effects of B.T. cotton on adult honeybees, brood and hive products if any, is topic for further research. Other crops which are considered good for apiculture are sown on very less area. Average area under *Brassica* crops, Til (*Sesamum indicum*.L.) and Arhar (*Cajanus cajan*) was only 5419, 363.5 and 36 hectare, respectively. According to Montgomery [2] under favourable conditions up to 75kg of honey can be extracted from one hectare of sunflower (*Helianthus annuus* L.) by honeybees (*Apis mellifera*). But Sunflower is totally neglected by farmers of this district.

4.2 Less area under horticulture and Vegetables

Fruit and vegetable plants are very good source of nectar and pollen for bees but only 670 hectares of land of this district is under horticulture which includes Kinnow (*Citrus reticulata*), other citrus fruits, Guava (*Psidium guajava* L.), Peach (*Prunus persica* L.), Grapes (*Vitis vinifera*) and Ber (*Zizyphus sp.*) in 336,7,129,7,57 and 134 hectares respectively. Land under vegetable crops is 1203 hectares only.

4.3 Less area under tree cover

There is no true forest. Area under tree covers is less than 5 per cent. Trees of bee interest are Eucalyptus (*Eucalyptus*-sp.), shisham (*Dalbergia-sissoo*), Kikar (*Acacia-nilotica*) Jaman (*Syzygium cumini*), Arjun (*Terminalia arjuna*), siris (*Albizia procera*) and Shitoot (*Morus alba*) etc are grown on sides of roads, canals, drains and other places which are under the control of forest department. About 116 hectares of Eucalyptus has been planted by different farmers of this district.

4.4 Floral scarcity/Dearth period

There is totally a dearth period in the month of May and June. The crop rotation is such that from mid April to end of May fields are empty. Farmers prepare soil for next crop. Bee colonies have to be fed with sugar syrup. Few beekeepers also use pollen substitute. Strength of bee colonies is reduced to half. Only after rainfall, weeds of bee interest grow, which include *Tribulus terrestris*, *Digera arvensis*, *Trianthema portulacastrum*, *Cyperus rotundus*, *Cleome viscosa*, L & *Cucumis trigonus* etc. In the month of October and November there is floral scarcity again.

4.5 Burning of straw

In spite of ban by government of Punjab, paddy and wheat straw is burnt in fields which affects bee population as well as bee movements adversely and mortality rate increases.

4.6 Excessive use of chemicals in Agriculture

Pesticides, fungicides and weedicides etc., when applied to blooming crops caused severe damage to bees. Sudden appearance of large number of dead or dying bees at the entrances of bee colonies could be observed in various apiaries of this area during flowering season of various crops, which is an indication of pesticide poisoning. Such poisoned bees showed uncoordinated movements, became paralytic and lost the power of orientation. It has been observed that Edosulfan 35 EC and phosalone 35 EC are comparatively safe when sprayed to crops late in the evening as confirmed by many workers [3] and [4]. Use of bee repellents to discourage them from foraging on the pesticide treated crops, is not in practice.

4.7 Lack of awareness regarding pollination

Beekeeping occupies an important place among the agricultural enterprises and sustainable agriculture. Honeybees play a vital role in pollination of various crops [5, 6 and 7] and pollination of entomophilous crops by them is one of the most effective and cheapest method of increasing crop yield [8, 9 and 10]. Despite the great economic and biological significance of honeybees as pollinators of agricultural crops, beekeeping has not yet been made an integral part of agricultural management technology here. Only 130 farmers of this district are doing beekeeping and have 3147 bee colonies only. Most of the farmers are not aware about the value of honeybees as pollinators.

4.8 Honeybee diseases, pests and enemies

Honeybees like all other creatures suffer from many diseases and are attacked by various parasites, pests, predators and enemies. Nosema disease has been observed in many apiaries. Ectoparasitic mites, *Varroa jacobsoni* has caused a severe damage in this district in last decade. Pests like lesser wax moths (*Achroia grisella*), Greater wax moth (*Galleria mellonella*) and Hawk moth (*Acherontia styx*) were present. 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. Similar type of observations were recorded by many workers. [11, 12 and 13]. Predators included wasps (*Vespa sp.*), green bee eater birds (*Merops sp.*) and black drongo (*Dicrurus adsimilis*). Other minor enemies include spiders, toads, ants and lizards etc.

4.9 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 [14, 15, 16, 17 and 18]. Survey of apiaries of this district revealed that the most of beekeepers are lacking bee management techniques and skills which are summarized below.

1.9.1. Bee behaviour ,hives and beekeeping equipments

Most of the beekeepers get economic loses because of swarming and robbing because the do not follow proper guidelines when seasons change. Only 20 per cent beekeepers have proper knowledge regarding queen introduction, laying workers, uniting colonies and cleaning bottom board. Inner boards in hives, drone traps, queen cell protectors, pollen traps etc are not being used. Only 5 per cent beekeepers use queen excluders in supers which are necessary for increasing quantity and quality of honey.

1.9.2. Bee forage

Good bee forage is the primary requirement for beekeeping and honey production but continuous succession of blooming crops is lacking in this district due to deforestation and the lack of crop diversification.

1.9.3. Examination of colonies

Examination of hives at regular intervals is necessary to observe their condition and requirements, otherwise it may cause economic losses in the form of swarming, absconding, and laying workers etc. Information collected from various apiaries of this district showed that usually inspection operations are delayed. Only 20 per cent of beekeepers perform examination of colonies in proper way.

1.9.4. Bee Nutrition

During dearth period sugar syrup and pollen substitute should be given to the bee colonies. But beekeepers of this area give only sugar syrup. Pollen substitute is provided only by 6 per cent beekeepers. There is shortage of pollen in one or another part of year. Natural pollen can be collected by using pollen traps, when pollen income is sufficient (from mid January to mid March). This collected pollen can be preserved and may be used during pollen shortage periods. This technique is not being used. About 95 per cent beekeepers do not know how to collect & preserve pollen. Stimulative feeding is also not in practice.

1.9.5. Queen Rearing

Grafting technique is the best method of queen rearing ,but less than 5 per cent beekeepers use this method .The method used by most of them is formation of queen cells by simply dequeening the colonies which is a disadvantageous practice ,Thus beekeepers get poor quality queens and loses more time with respect to egg laying and brood rearing which give a big set back .Only 2 per cent beekeepers did selected breeding .A commercial beekeeper must always store surplus mated queens in small nuclei but on an average only 2 per cent beekeepers followed this practice.

1.9.6. Hive Products

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. Honey processing is recommended by various workers [19, 20, 21, 22 and 23] but such practices are not followed here. Annual honey production of this district during years 2008 – 2011 was 38461 kg, which means 12.221 Kg /colony/year as there are 3147 colonies. This honey yield is quite low.

1.9.7. Cleanliness and arrangement of apiaries

It was observed that 50 per cent apiaries were not clean .Broken and old combs were lying here and there with wax moth and fungal infestation, In 70 per cent apiaries hives were placed very close to each other (fig. 2) against recommendations (hive to hive distance should be 6 to 10 feet and row to row 12 to 15 feet) which caused drifting and robbing .Extra combs for further use were not stored properly by 60 per cent beekeepers. Termite damage was also observed in hives which were not placed on stands , in 20 per cent apiaries.

1.9.8. Lack of regional research centre

There is no research centre in this district to tackle problems like bee diseases and for working out bee management techniques. Training given to farmers by partially trained workers of department of agriculture is non-satisfactory.

V. Recommendations

To help in development of beekeeping industry in Mansa district of Punjab following recommendations are being made-

1. Farmers should be made aware regarding apiculture and pollination. Beekeeping should be made an integral part of agricultural and horticultural techniques .Promotion of beekeeping as an employment generation activity is the need of hour.
2. Diversification of crops is urgently required ,so that period of floral scarcity may be decreased .Area under horticulture, vegetables and tree cover (tree of bee interest)must be increased.
3. Excessive use of pesticides, weedicides, fungicides should be avoided. Organic farming must be encouraged. Pesticides like Edosulfan 35 E.C., Menazen 70 D.P. and Phosalone 35 E.C. are comparatively safe .Bee repellents can be used along with pesticides to decrease mortality rate of bees. 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 effect bee population.
4. Migratory beekeeping is suggested during dearth period .Sugar syrup and pollen substitute should be given at proper time.
5. Apiaries must be kept neat and clean. Colonies should be arranged properly. Regular inspection is necessary to check swarming, absconding, laying workers etc.
6. Bottom board should be cleaned at regular intervals. Crevices in hives must be sealed. Sulphur dusting at proper time is necessary. Extra frames from hives must be removed and stored separately with fumigants.
7. Colonies must be kept strong as such colonies can win over every disease and enemies like wax moth etc. Proper management techniques should be followed.
8. Queens must be reared by grafting method. Selective breeding is also necessary to improve the honeybee stock. Surplus mated queens in small nuclei must be maintained.
9. Collection of hive products other than honey, like royal jelly, propolis, bee venom and pollen must be done to make the beekeeping more profitable.
10. Processing of the honey should be done.
11. There should be a regional apicultural research and training centre in district to impart proper training of beekeeping and to sort out related problems.
12. Government should pay attention towards marketing of hive products and encouraging apiculture.

Fig. 1. Picture showing mite, varroa Jacobsoni (in circle) on a comb with sealed brood of Apis mellifera, which caused great economic losses during last decade.

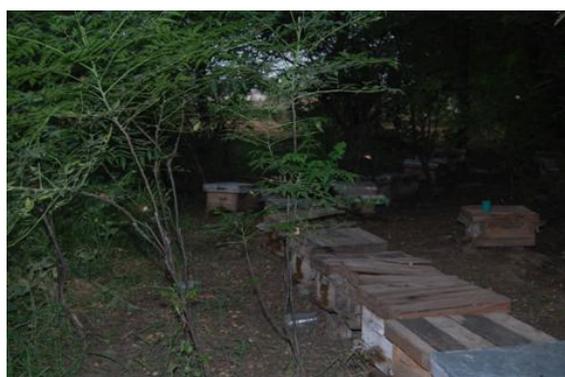


Fig.2 Wrongly placed colonies in an Apiary.

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