Traditional beekeeping in Kinnaur district, Himachal Pradesh

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2000

Keywords: beekeeping, traditional knowledge, *Apis cerana*, Himanchal Pradesh, India.

The Historical Context

The earliest literary sources concerned with *Apis cerana* beekeeping come from the Rigveda Canon. I incline towards the view that the Aryan warriors, at the time of expansion from the Indus area, had the knowledge about honey hunting, but they became skilful beekeepers only gradually when they moved towards the Himalayan valleys. In the forests there, *Apis cerana* colonies were most likely in great abundance. If even the Aryans were “hardly more than hunters” (Joshi et al. 1980), prior to coming to Himachal they surely became skilful apiarists. It can be said, on the basis of literary sources, that the starting point of Aryan beekeeping is the Ribhu’s brother’s innovation (Joshi et al, after Dave). It was a kind of simple skep.

In that time the knowledge about bees was not limited to recognition of two kinds of honey: from *A. dorsata* and *A. cerana*. It was known that combs consist of hexagonal cells placed in rows, and that honeycomb with ripe honey is sealed. The Aryans made observations where bees usually settle in natural environment. They considered the bee colony to reflect the hierarchy of the kingdom of man, that bees sting (which was easy to see when in direct contact), and the stinging organ is located in abdomen. Swarms have been decoyed to skeps where fragments of wild combs were fixed. From every strong *A. cerana* colony they have taken up to four combs (probably per year). The rest was left for bees. Swarming bees were usually sprinkled with water. Techniques of management and beekeeping equipment were improved gradually.

According to development of medical sources the four kinds of honey were known. In treatises by Sasruta and Charak, called fathers of Ayurveda and Surgery, we can find information that honey from *A. cerana* causes heating when applied directly. It should be used in the case of colds, tuberculosis and as a metabolism-activating factor. *A. dorsata* honey was regarded by them as comparable and was used in treating similar diseases. Gradually as much as eight kinds of honey were known. The base of differentiation was the colour and rate of the process of granulation. Ancient scientists had noticed that some
honeys changed their properties when granulated and after heating. They can even be toxic (Prakash 1961:143).

In the Post Vedic Period, the main literary achievement of which is Ramayana, we have remarks about specialist apiaries - “bee gardens” with a lot of colonies in one place (probably hived in skeps). Beekeeping was one of the popular crafts. If we take as a true that Ramayana was earlier than the other literary sources of that period, in which beekeeping is not mentioned, we can interpret it as showing gradual decrease in the Aryan’s interest in beekeeping. It should be remembered that honey is no longer the only sweet substance known, but is still indispensable in rituals. In everyday life it is replaced by sugarcane products (Prakash 1961:113). Techniques of purifying sugar were also known. The Hindi word madhu -honey, remains as a root of various words describing “sweetness”. Centuries later we can only speculate about real ingredients of particular food articles, whether they were made with the addition of honey or sugar.

In early Buddhism and Jainism, honey was quite popular but increasing sugarcane cultivation caused it to be the main source of sweetness (Prakash 1961:67-69). In both traditions descriptions of sugar use predominate, and is most important also, in rituals and religious ceremonies.

Taking into account the speed of March of the Aryans, it seems impossible for them to populate the high mountainous part of Kinnaur before the beginning of the new era. From the IVth century AD, there is a clear gap in Indian historical sources concerned with certain parts of Himachal. As a result, the period between IVth and XIXth century brings no evidence of beekeeping there (Joshi et al 1980). On the other hand it is obvious that bee- and honey-hunting and beekeeping was still being practised.

The Economic Context

The sources of information concerning the economic context are somewhat scarce. The main point is that highlanders do not like to disclose details about their possessions, especially livestock. This phenomenon occurs all over the world and is not an Indian problem only. Some processes of production and Census categories are hidden from the eyes of registering teams. Additionally, the man from “outside” comes upon serious logistic problems during the work in high mountains. In 1989, the whole state production was 150 tons of honey in 1989 and 3 tons of wax. The above figures were estimated on industrial market outlets. As for similar products, the cited data does not include traditional trade links which are still more important and suitable for individual producers. The exact quantity of production of both basic bee-products is difficult to calculate.
From one Apis cerana colony, the honey yield varies from 3 to 5 kg per year (Mattu 1989:187); for India the average yield is 4.3 kg (Verma 1990:224 after Attwal and Goyal 1973). During the fieldwork I have estimated that honey yield for the upper Kinnaur is rarely as rich as 3 kg. The most usual varies from 2 kg to 3 kg.

At the described area, the activity of insect pollinators is gradually falling down. It is the consequence of diminishing numbers of the forest's complexes and increasing environmental pollution. Pollinators with a small radius of flight are pushed into relatively limited enclaves where they can not be of great importance for man. Such situation is responsible for today's necessity of rational management of existing Apis cerana colonies. It is the fundamental ratio for the whole Himachal, which is the main producer of moderate climate zone fruits. Orchards in Himachal are established at 75,000 hectares, where for their proper pollination there is a need of 200,000 bee-colonies, while the real state is not more than 10000 families (Verma 1990:25). The present successes in fruit production in Kinnar are based on existing population of bees, especially Apis cerana, kept in traditional wall-fixed hives. In the case of large-scale agricultural attempts (possible at lower Kinnar only), for optimal formation of fruits and seeds, two colonies of Apis mellifera or three colonies of Apis cerana per 1 hectare are needed (Verma,1990:27).

The Technological Context

It is well known that beekeeping in H.P. was developed much, much earlier than in Europe but it is scarcely described and poorly documented. Generally, in Asian scientific literature, the existing techniques at "tribal areas" are identified with the earliest elsewhere.

Log-hives in Kinnar occur in two versions: horizontal (long-idea hive) and vertical. For the horizontal ones no hive stand is in use. The 60-75 cm piece of a hollowed tree trunk is plugged with flat wooden, stone or metal covers. In its middle the entrance is made. The entrance is about 6 mm in diameter (Verma 1990:112-113). The space between the hive and covers is usually sealed up with the mixture of clay, water and cow dung. To the upper part of the nest the strips of old combs are fixed in such way that between them the spaces of 30 mm are left. The middle part of the log hive is left empty. Bees firstly build combs marked with strips and then build combs in the inner and empty part.

Vertical log-hives are also made of hollowed pieces of trunk. It is often placed on solid, wooden or stone hive stand. Upper hole is closed with wooden cover (nowadays with metal one also). In the lower part of this hive some hollows are made in raw parallel to base. Their number usually is more than one. L. R. Verma (1990) suggests "five to six". The majority of this type of hives, documented by myself in the field, has from one to three hollows (entries). It looks as regularity that entries are pierced in the extreme low part of the
hives. I did not find in literature or in the field cases when entries are made in upper or middle part of the vertical log-hive (which was a popular way in European beekeeping). All construction spaces in A. cerana hives should be properly sealed and it is usually done. In the case when beekeeper does not take care of them, it can lead to danger of robbery (enemy species of insects, rodents, small reptiles and amphibians), or to upsetting the nest’s balance (which is the most important for hard mountain conditions).

In both described types thickness of the lift is between 3 to 12 cm. In the described area the two most popular wood species for hive constructions are Cedrus deodara and Pinus Roxburghii. Simple associations of ideas about thickness of hive lift and temperatures, which occur in the coldest season at the area of interest, are not backing each other. My fieldwork data states that log-hives found in any one location are usually of different thickness. Only very rarely are such hives isolated with extra thermal protectors. I did not notice such practices in Kinnaur.

The most common way of hiving bees in mountain areas of Himachal are wall-fixed hives, located directly in ground floor walls of houses or barns. It is impossible to prejudge if such wall-fixed hives are younger constructions than log-hives. For the described area we do not find wall-fixed hives in locations made especially for them in separate walls, typical for Kashmir and Ladakh. Inhabitants of Kinnaur, may be due to their known practical sense, build-in hives into building constructions of different appropriation. The only thing to change if an owner wish to keep bees in ground floor wall is to thicken that wall (or walls). In that way prepared wall, bees find places for their nests. The hive’s cross-section is rectangular (included square), oval in shape (hollowed tree trunk), and trapezoid. In the case of such beehives, a huge amount of techniques of building them is known to occur.

The builder should take place for hives into consideration at the earliest stage of building the walls. According to the technology applied the location and space between bottom and top beams of a hive (row of hives), are resulting from construction scheme or are specially prepared. Ready hive is fitted into the hollowed wall. The level of popularity of such wall-in hives does not make classification easier, but it seems that traditional housing in Kinnaur District was and is based on framework in deodar wood (ground floor), supplied with stone blocks and clay mixture. By such way of erecting buildings, at least bottom and top beams of hives are up to 15 cm thick. It is usual that constructive beams are left visible. Highlanders are very proud of high level of esthetic valours of their houses. If they only can, they use regular horizontal and vertical beams. It makes possible that hives are given very solid sides. To bring above notes all together it should be stated that besides high aesthetic valours (from the human point of view), bees can settle in the nest with good thermal protection. During the long and snowy winter season even such solid frames are not sufficient. From both sides (front and back) fixed wall hives are
covered also with wooden lifts. Especially the front one is worth noticing: often fitted with beautiful carvings of animals (elephants, camels) and floral motifs, it is one of the most decorative elements. Their thickness is not as considerable as the back ones. The front cover is equipped with singular entrance shaped round, oval (Verma 1990:117), and triangular (R.B.). Bottom entrances are the most popular. Besides this type, entrances are found in the middle and top of the hive's front. Top entrances have the least frequency in the field. Bottom cover is prepared for repeated opening. Not only the combs are being cut off through it, but the hive remains open from the back side during the winter. Honey is collected once a year in the autumn (in early September). This fact makes beekeeping in Kinnaur similar to traditional European one in the belt of moderate climate. The combs are cut off as a whole or only their parts (approx. half of them) 28.

From such hived *Apis cerana* families the yield is about 3 to 5 kg of honey per year. A lot of specialists have noticed the problems with proper examinations of such hive construction, and introducing some modern management methods accordingly. On the other hand it is known fact that *A. cerana* families abscond and swarm much more often from the modern hives than from the traditional ones (Verma 1990:118).

The Political and Administrative Contexts

Beekeeping, like other branches of economy at the Indo-Tibetan borderland inhabited by "tribal" people, has come under pressure of external policy. It should be kept in mind that some basic changes have occurred in the newest history. Due to the Chinese invasion of Tibet (1952-59), and conflict between China and India in 1962, the Indian Government was forced to built hundreds of kilometres of roads in the mountain areas next to borders. It is not an accident that from this time we can observe "a jump" into horticultural economy in the high, mountainous valleys of Kinnaur. Trade links with Tibet, which have lasted for time immemorial, have suddenly stopped. Local inhabitants have lost one of the basic sources of income. In the described case of beekeeping, honey was one of barter exchange goods with the Tibetan traders.

The Present status and Perspectives of Beekeeping in Kinnaur

The current situation is a picture of rivalry between two hived species. L.R.Verma (1990:71) indicates, taking into consideration various sources, that one *Apis cerana* family brings income equal to 369 IRs per year, when *A. mellifera* one brings in the same time so much as 920 IRs. Such differences in yielding prejudice that long range Central Government plans are concerned with *A. mellifera*. In the context of the above, those plans should be revived, at least in the part of high mountainous areas of the country.
Beekeeping is becoming even more attractive than it was in history. General analyses of mountain environments potentials indicate its superb position. Attention is placed on the set of unique qualities (in joint composition), which calls for new practical solutions and which can intensify this branch of economy. Low weight; relatively high value of bee products; durability and long-lasting stability of physico-chemical features: the ease of storage; handiness in transport are the main characteristic values of bee-products.

Despite many scientific projects (also international) which are pointed at modernisation of mountain beekeeping, they are not generally successful. Several things cause moderate results. The highlanders of Kinnaur are traditionally bound up with wall-fixed hives. Universal distrust in new constructions by far did not disappear, as they are not suitable for such environments. It is also hard to estimate how seriously the “religious” beliefs should be treated. The bee-family is, for traditionalists, an obvious sight of Laxmi, Vishnu and local Devtas protection of the house.

Economic analyses indicate that beekeeping is in progress. I believe that in the near future even hiring of migratory apiaries from lowlands can be a common sight in Kinnaur. Such or other intensification of horticulture will be done paralelly to traditional ways of beekeeping with wall-fixed hives. Spectacular successes of particular beekeepers will serve as road signs for others. But for the majority of Kinnauris beekeeping will remain as extra, part-time activity. Its value will be restricted, especially for newcomers, to income sums gained for sold honey and wax. Many years of intensified strains are needed to change present status. The role of bees in the process of cross-pollination is practically unknown. At the same level should be treated projects concerned with increasing the role of women at non-urban areas.

According to the authors of these projects, the opportunity of beekeeping would be the most stimulating factor for them. Beekeeping with _A. cerana_ is the most traditional activity together with goat and sheep pastoralism. The current central plans do not plan any radical changes in the everyday reality as it is known. Beekeeping is taken into consideration only fragmentarily and in the meaning of dealing with _A. mellifera_. Governmental beekeeping agendas, subsidies, beekeeping courses, KVIC, international aims are not pointed towards causing positive changes in high mountain - "tribal areas". The main reasons of these limited actions are seen in corruption of officials and treating "tribals" as nationals of second category.

**Conclusions**

The mere act of introduction of hundreds of modern hives to Kinnaur will not solve various problems which have been outlined in this paper. Disinclination for innovations among highlanders from Kinnaur will partly protect natural ecosystem. Traditional hives, in shape and their location are solid -significantly
safe-element of environment. For centuries they have been taking care of A. *cerana* bees in the way which came down from their fathers. It would be unwise to neglect their knowledge in the process of modernisation. A history is a continuing process. Nobody is able to change it, but wise protection of Kinnaur's heritage is an absolute necessity. In the process of improving tourism in Kinnaur, the traditional image of villages should not be changed. Wall-fixed hives are, besides all economic relations, the important decorative motif of almost every house. For anyone who was there it is hard to imagine settlements without such elements.
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