

# Introduction

*L.R. Verma*

International Centre for Integrated Mountain Development  
Kathmandu, Nepal

Apiculture (Beekeeping) is an important resource base of mountain farming systems and offers specific advantages for developing sustainable agriculture. It is an exclusive non-land based activity which does not compete with other farming systems for resources. It also helps in the conservation of forest and grassland ecosystems because honeybees render essential ecological services such as cross-pollination and propagation of plant species thereby maintaining biological diversity.

The most important aspect of apiculture is that it is an important income-generating activity in the hills for small and marginal farmers, landless labourers, and other weaker sections of society living at, or under, subsistence level. Hive products such as honey, beeswax, royal jelly, and pollen provide both nutritious food and cash income. These are in demand both locally and for export market. Beekeeping is a flexible occupation which creates off-farm employment and diversifies the economy. Inputs for apiculture are mostly simple and locally available. Yet another significant, but not widely recognized, role is that honeybees enhance the productivity levels of agricultural, horticultural, and fodder crops through cross-pollination. It has been estimated that the value of honeybees as producers of honey and beeswax is only a small fraction of its value as crop pollinators.

There are at present four or more species of honeybee in the Hindu Kush-Himalaya. Among these, *Apis cerana*, *Apis dorsata/laboriosa* and *Apis florea* are native to this region, whereas, the European honeybee, *Apis mellifera* has been introduced in some countries of Hindu Kush-Himalayan region. The Asian hive bee, *Apis cerana* and the European hive bee, *Apis mellifera*, can be domesticated but all attempts to domesticate the other two species of honeybees have so far failed. Such a great diversity of honeybee at the species level in the Hindu

Kush-Himalaya is not only the basic source of most of the commercial or domestic honey and other hive products, but they also enhance productivity levels of many cultivated crops through cross-pollination.

### **Exotic *Apis mellifera*: Problems and Prospects**

As a result of continuous research efforts in the area of genetic diversity, selective breeding, and improved management practices, *Apis mellifera* produces three times more honey than *Apis cerana*. *Apis mellifera* is also superior to *Apis cerana* due to its maintenance of prolific queens and less swarming and absconding tendencies. However, many importations of exotic *Apis mellifera* in the Hindu Kush-Himalayan region have proved disastrous. When kept sympatrically, *Apis cerana* and *Apis mellifera* colonies frequently rob each other (Koeniger 1982). Another cause of failure in the co-existence of the two species is attempted intermating which produces lethal offspring (Ruttner and Maul 1983). A new problem is the transfer of parasites from one species to another. A parasitic mite of brood and adults, *Varroa jacobsonii* can co-exist with *Apis cerana* and causes no serious damage to this native bee species. In several parts of Asia, where both the bee species are now kept together, the parasitic mite has infested *Apis mellifera* colonies and become a serious pest to this unadapted host. There is now apprehension that importation of *Apis mellifera* will lead to the decline of *Apis cerana* populations in its native habitat to a level that threatens its existence as a valuable genetic resource. In Japan and China, *Apis cerana*, is now largely replaced by imported *Apis mellifera* colonies. Other Asian countries such as Pakistan and India are now following this trend.

### ***Apis cerana*: Problems and Prospects**

*Apis cerana* has many valuable characteristics of biological and economic importance. These include their docile and industrious nature, their being less prone to attacks of wasps and a high level of resistance to nosema disease and the parasitic Asian mites, *Varroa jacobsonii* and *Tropilaelaps clarae* that plague *Apis mellifera*. *Apis cerana* can co-exist with other native bee species and requires little chemical treatment of colonies to control epidemics. However, this native bee species has not yet become popular amongst beekeepers because of several behavioural characteristics. These include the frequent swarming and absconding, the tendency to rob, production of a large number of laying workers and lower honey yields. These negative traits show eco-geographical variations depending upon the sub-species/geographic ecotype and management efficiency of the beekeepers (Verma 1990).

Some of these undesirable behavioural traits, from a beekeeping point of view, may have emerged in *Apis cerana* during the process of evolution as a result of harmful exploitation by man. For example, through traditional methods of beekeeping, which are in vogue even today, most of the bees were killed during honey harvesting and no honey store was left behind in the nest for consumption by bees during dearth periods. As a result, the colonies of *Apis cerana* that survived and propagated in nature developed the traits of frequent migration and absconding to safer and better pastures. In order to reverse such trends, a strategy through development and promotion of beekeeping with *Apis cerana* in modern movable hives is needed where moderate honey harvests are collected in a timely manner without harming the bees. In order to make such strategies successful, the foremost requirement is exploration and evaluation of different sub-species/geographic ecotypes of *Apis cerana*, which has not yet been done in detail in its native habitat.

The expert meeting was organized to discuss methods to overcome some of the above constraints. It is hoped that the recommendations of this meeting will help to raise the status of this rural industry from traditional honey hunting into a viable income-generating activity and a stable occupation for rural communities living in the Hindu Kush-Himalayan region. The major objectives of this workshop were as follows:

—Bring together apicultural experts from the Hindu Kush-Himalaya (and other parts of the world), for an exchange of knowledge, and to focus on relatively successful developments in mountain apiculture, in China and India, as well as on the extent to which they are relevant to other mountain areas in the Hindu Kush-Himalaya.

—Bring awareness to the Governments of the Hindu Kush-Himalayan countries, and international organizations, concerning the importance of mountain apiculture in providing extra food, pollination of crops, employment, nutritional benefits, and cash income to the weaker sections of rural society.

—Explore the possibilities of establishing a regional Apicultural Research and Training Centre, with substantial international funding, in the Hindu Kush-Himalayan region. This would help create a centre of trained experts and generate and deliver improved apicultural management technology, through basic and applied research, primarily on Asian species of honeybees.

## REFERENCES

- Koeniger, N. 1982. Interactions among the four species of the genus *Apis*. In: *The Biology of Social Insects*, Breed, Michner and Evans (eds), Westview Press, Boulder, USA.
- Ruttner, F. and V. Maul. 1983. Experimental analysis of reproductive interspecies isolation of *Apis mellifera* and *Apis cerana*, *Apidologie* 14: 309-324.
- Verma, L.R. 1990. *Beekeeping in Integrated Mountain Development: Economic and Scientific Perspectives*, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.