

Chapter Five

Conclusion

Melissopalynological study besides enabling to infer the botanical source of a given honey sample also serves to indicate its geographical source on the basis of the characteristic associations of component species. (Chaubal and Deodikar, 1965).

Sikkim and Sub-Himalayan West Bengal with varied and rich floristic complex have the natural potentialities for organized apiary industry and production of commercial quantities of honey. Single sources of honeys (for unifloral honeys) like *Schima*, *Citrus*, *Buddleja*, *Prunus*, *Ageratum*, *Rubus*, *Rosa*, *Calendula*, *Fragaria*, *Michelia*, *Brassica*, *Potentilla*, *Aristolochia*, *Sedum* and *Trifolium* along with varied multiple sources (for multifloral honeys) from different pollen taxa place this study area in significantly high status from 'bee-keeping' point of view. There are greater chances of economic gains from higher honey yield with better qualities if the information gathered in the present study from melissological point of view are used judiciously by the local bee-keepers.

Other than the finding of botanical sources of a honey sample the present study also enables to detect artificial mixtures of different unifloral and multifloral honeys by way of deliberate adulteration or misrepresentation. Some of the unifloral honeys are specially preferred for their taste, flavour, nutritive value or medicinal properties. In such cases the pollen analysis provides a reliable assurance for the consumer (Chaubal and Deodikar, 1965).

The bee forage plants of this zone can be categorised into three groups : 1) Crop plants 2) Herbaceous weeds and 3) Arborescent taxa.

The establishment of large scale apiary colonies in the vicinity of all such areas would result in assured supply of good quantities of honey. Further, it would also result in increased crop-production because of higher percentage of pollination in flowers. Hill and Webster in 1995 in their study on apiculture and forestry (bee and trees) opined that purposeful planting of

trees as in agro-forestry systems, could be designed to favour bee forage or hive protection. Tree growing and bee keeping can easily be combined for several reasons. Both are sustainable on land that is hilly or otherwise less desirable for other agricultural purposes. Combining forestry and bee keeping provides annual honey bee products (eg. Honey, bee waxes) to supplement income from a landowner's long term forest management.

For the improvement of the socio-economic set-up of the local people in the region following suggestions in this line may be made.

1. Local farmers should be encouraged to grow more bee forage which are the crude sources of honey production at the same time deforestation need to be checked by rendering them proper environmental education
2. Plants supplying poisonous and allergic pollens like *Rhododendron*, *Aesculus*, *Papaver* etc., as mentioned earlier should be avoided during their flowering season for safeguarding the consumers' interest.
3. Local people should be educated properly for discouraging the random use of pesticides to save the honey bees which produce not only honey but also improve the crop production and thus helping in the maintenance of ecological balance.
4. Some of the major factors should be considered while educating the local people before making pesticidal applications like (a) Extent of toxic effect on bees from the chemicals used in making pesticides. (b) Estimated loss in honey production from hives within 3 km radius of the crop, if treatment would necessitate their temporary removal of the hives, (c) Estimated loss of pollination if hives are removed.
5. Large scale bee-keeping industry and some ancillary industries based on honey and its by products like pharmaceuticals, baking, confectionery, cosmetics, veterinary, boot & floor polishes, wax models, insulting tapes, dentistry casting, lithography etc. along with bee nurseries, bee equipment and hives may be developed in this

zone. This will give enormous opportunities to the local people in providing employment directly or indirectly particularly in this era of unemployment.

6. Productive efficacy of the apicultural industry depends upon improvements in : (a) bee breed, (b) bee management and (c) bee forage. Of these three bee forage involves adequate attention to bee forage plants in local flora. Some such plants which deserve consideration at different seasons are as follows-

SUMMER/SPRING –

Ammommum sp., *Citrus* spp., *Schima wallichii*, *Prunus* spp., *Buddleja asiatica*, *Rubus* spp., *Primula* spp., *Calendula officinale*, *Fragaria* spp., *Potentilla* spp., *Rosa* spp., *Clematis* spp., *Trifolium repens*, *Torenia peduncularis*, *Tropaeolum majus*, *Erigeron karwinskianus*, *Cineraria grandiflora*, *Milletia* spp., *Brassica* spp., *Bassia butyracea*, *Centaurea* spp. etc.

WINTER –

Aristolochia spp., *Rosa* spp., *Ageratum conyzoides*, *Tithonia diversifolia*, *Calendula officinalis*, *Thunbergia* sp., *Erigeron karwinskianus*, *Brassica* spp., *Cardamine hirsuta*, *Magnolia* sp., *Oxalis* sp., *Spirea* sp., *Datura* spp., *Solanum* spp., *Cestrum* spp., *Cyphomandra betaceae*, *Rubia* spp., etc.

AUTUMN –

Michelia spp., *Brassica* spp., *Sedum multicaule*, *Ageratum conyzoides*, *Citrus* spp., *Begonia* spp., *Berberis* spp., *Linaria* spp., *Trifolium repens*, *Desmodium* spp., *Gynocardia odorata*, *Dichroa febrifuga*, *Holboelia latifolia*, *Michelia* sp., *Magnolia* spp., *Passiflora* spp., *Primula* spp., *Rosa* spp., *Prunus* spp., *Rubus* spp., etc.

So the present work signifies the importance of apiculture in this floristically rich region. Manifold benefits like getting both pleasure and profit, food and nutrition at the same time maintenance of ecological balance will be achieved through this goal.