CHAPTER – 1 INTRODUCTION

Stingless bees are amongst the longest evolved bees and have been found preserved inside pieces of 80 million years old amber. Stingless bee is the smallest (4.0 to 5.0 mm long) of the honey bees. Honey bees and stingless bees belong to the family Apidae and assigned to separate subfamilies, Apinae and Meliponinae, respectively (Culliney, 1983). Unlike honey bees, stingless bees cannot sting. Stingless bees have attained the most advanced level of social organization which can be comparable to that of honey bees (Sakagami, 1982). Stingless bees are among the least known of all social bees, probably because of their tropical distribution (Michener, 2000). Stingless bees are dispersed throughout most parts of India and form an important group of pollinators in agricultural and natural ecosystems.

Beekeeping with stingless bees is called as meliponiculture, which has been practiced for many centuries in various parts of the world. It is found in the wild and also deliberately kept by beekeepers for pollination and its highly priced honey, because of its high medicinal value. Stingless bees are known to be generalists with regard to selection of nesting sites (Hubbell and Johson, 1977; Roubik, 1979). Like honey bees, stingless bees nests in hollows of tree trunks, stone walls, mud walls, corners of walls, crevices, termite mounds and other such concealed places. One major component of the stingless bees nests is the excellent insulation, especially with the exposed nests. Nests in large trunks or in soils are particularly well insulated. Stingless bees keep their honey in ellipsoidal pots made with cerumen which is a mixture of wax, resin, propolis and mud.
As in honey bees, their principal resources are pollen and nectar which is collected from the flowers. They make honey as *Apis* species do, and can be kept in hives as *Apis mellifera* and *Apis cerana* (Crane, 1992). Their resident colonies depend on flowers for all their food and forage throughout the year. During foraging, *Trigona* shows preferences for different plants. Their small size allows them to have access to many kinds of flowers whose openings are too narrow to permit penetration by other bees and they are common visitors to flowering plants in the tropics (Heard, 1999).

There are many flowering plants, but not all can be harvested by honey bees, because of their physiognomy (body size and shape, length of proboscis, etc.). In apiculture, a plant is classified as melliferous if it can be harvested by honey bees. Knowing the plant species used as sources of pollen and nectar is of great importance to beekeepers. There are many endemic plant species with important beekeeping potential that are good geographical markers (Borges *et al*., 2006).

The plants visited to collect nectar can be identified from the analysis of pollen contained in honey (Louveaux *et al*., 1970), also allowing the characterization of nectariferous plants and geographical origin. Following a monthly basis, the palynological analyses provide a valuable bee floral calendar.

Melissopalynological studies have received to date only marginal attention in various parts of India, especially in south India (Jhansi *et al*., 1993). The study deals with microscopic analysis of the pollen contents of seasonal honeys from a locality, when supplemented with critical field studies involving phenology and floral biology provide
reliable information regarding the floral types, which serve as major or minor nectar and/or pollen sources for the honey bees.

The pollen spectrum of a honey is also an expression of its geographical origin and also gives us a glimpse of major flowering plants in the area (Attri, 2010). Analysis of the evolution of honey pollen spectrum during the honey production period is extremely useful to detect the contributions of different nectar sources, used by bees for the production of honey in a region over the season which is of particular interest for hive management, classifying honey botanically and geographically according to its origin (Louveaux et al., 1978).

There is dearth of information on floral resources of stingless bees in India. However, it is necessary for every beekeeper to be familiar with the melliferous plants near or around the apiary for successful beekeeping operation. Understanding the major nectar and pollen producing plants and their flowering period is of great advantage to maximise the efficiency of bees. These explain the rationale for this study.

The objectives of this study were to make an inventory of the bee floral resources in Peninsular India with a view to prepare a checklist of melliferous plants, to report on the different nesting sites of *Trigona iridipennis*. Currently there is a little information on the nesting sites of this species despite the fact that, they are among the most common flower visiting insects and are most likely critical pollinators (Thapyai, 1996; Tasen, 2001; Jongjitvimol and Wattanachaiyingcharoen, 2006). The aim of this work is also to provide data that can be used to create a floral calendar for Peninsular India. Such data is important for the beekeepers so that, they can take informed decisions about the blooming
periods of plants important to honey bees, to know community interspecific competition for food, properly monitor the nectar flow season within their apiaries, prepare colonies for nectar flow season and locate profitable apiary sites. The present contribution forms part of a more comprehensive study of nesting sites, pollen analysis of diverse honey and pollen loads with the following objectives:

- To study nesting sites of stingless bee, *Trigona iridipennis*
- To study the flora of stingless bee, *T. iridipennis*
- To conduct melissopalynological studies of *T. iridipennis*
- To conduct palynological studies of *T. iridipennis*
- To prepare a floral calendar for stingless bee, *T. iridipennis*