

**Stingless Bee, *Tetragonula iridipennis* Smith
(Hymenoptera : Apidae) and it's Nesting
Pattern Preferences in Haveli Campus,
Bagalkote, Karnataka**

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ABSTRACT

In the study on stingless bees were conducted in Haveli campus, Horticulture College, Bagalkote on nesting pattern preferences. Stingless bees are by far the largest group of eusocial insects on the earth. Very few studies are conducted in Karnataka with respect to stingless bee hive density and its nesting preference. In this study small effort were made to know the nest preference of the stingless bee, shape and size of nest, places of bees visited and substratum of the stingless bees. The finding of this study helps to commercialize the domestication of stingless bees in surrounding areas of Bagalkote due to their adaptability and abundance in this region.

Keywords Stingless bees, *Tetragonula iridipennis*, Hive density, Nest site, Preferences

INTRODUCTION

Bees are very important for terrestrial ecosystem and above all, for the subsistence of many crops, due to their ability to pollinate flowers. Stingless bees are small (a few mm in length) and a resident species which nests on stone, old walls, dead trees and tree cavities. They are highly eu-social, safer for humans due to stingless and perennial nature which is desirable attribute often found in meliponi culture. In the natural settlement the nest arrangement of this bee is very peculiar. This nest is entirely different from other honey bee hives. Within the stingless bee genus, approximately 500 species were reported with the majority of species from Latin America, the main land of Australia, Africa and Eastern and Southern Asia (Rasmussen and Cameron 2010). The stingless bee, *Trigona iridipennis* was first originally described by Smith (1854) in Ceylon. Stingless bees (*Meliponini*) are a large monophyletic group of highly eusocial found in abundance in warm humid forests around the globe. Later this species was transferred to the genus *Trigona* as *Melipona* is restricted only to Neotropics (Michener 1974). The most widespread species of stingless bee found in India was known by name *Melipona iridipennis* Smith. It is distributed in India and Sri Lanka (Sakagami 1978).

The species found in Karnataka (Biesmeijer 1993) Kerala (Mohan and Devanesan 1999) and Tamil

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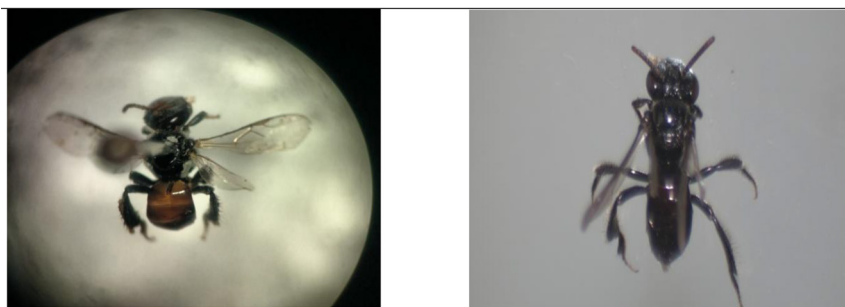


Fig. 1. Stingless bee at Haveli campus, Bagalkot.

Nadu have been reported as *Trigona iridipennis* (Swaminathan 2000). Asiatic stingless bee *Trigona (Tetragonula) iridipennis* Smith is one of the most primitive honeybee found in India with varying physiographic environment, higher altitudes and luxuriant flora offers an abode for the rich and wide distribution of stingless bee.

The species *T. iridipennis* is the only species found in India and its wings show iridescence hence the name iridipennis. Very little attention has been paid to study the biology, biometrics and foraging behavior of *T. iridipennis*, in India particularly in Karnataka. The work carried out in India and elsewhere on the bee flora that provide nectar and pollen for *T. iridipennis* is also limited. Hence,

in the present study observations viz., nesting sites, orientations, nest characters, longevity and elevation of nests have been selected to check the level of preferences exhibited by an indigenous resident species of stingless bee, *T. iridipennis* at the Haveli campus, Bagalkote (Karnataka).

MATERIALS AND METHODS

Study area : This study was conducted at University of Horticultural Sciences, Haveli farm (old campus) with naturally available colonies which are present in different habitats and especially in old concrete buildings wall. Each building had many colonies of stingless bees of same species. Most colonies studied and we found very little variation in hive



Fig. 2. Study area at Haveli campus in Bagalkot, Karnataka.



Fig. 3. Nest entrance of stingless bee.

entrance hole with wax and propolis to construct their specific entrance.

Data collection : The main task of locating the feral colony was possible by identifying the movements of the bees toward nest entrance. A visual based method has been applied to search the nesting sites. All the nests were found on the walls of various institute buildings, such as various hostels, canteens, offices, and residential quarters.

Nest orientation : The different orientation of the nest been recorded based on the visual observations. All the nests we located are found facing towards North, South, West, Hardly two nests found facing towards east. We observed orientations of the colony to know the most preferred direction of stingless bees.

Nesting site : In general nest density of this species in terms of : Nest number, number of foragers per-minute (with pollen, without pollen), flora visited. All

the nests were found on the walls of the buildings. We estimated the number of hives in Haveli region.

Nest architecture : The active nests have just one entrance tube made of cerumen. The entrance of the nest may be simple hole, often extended from the nest as an external tube. The length of the entrance tube varies widely. The entrance usually consists of simple cracks or holes about one cm on the walls of the buildings. Inactive nests on house walls were with small nest entrance with circular hole, surrounded by dark resin and with no outer tube.

RESULTS AND DISCUSSION

Usually the stingless bees (Figs. 1–4) built their nest on trunk of trees, logs, wall crevices (Fig. 4) and under the roof of dwellings. Stingless bees mix the plant resin with wax to construct the entrance of the nest (Fig. 3) and also coat the resins over the hive to protect from predators. The opening size of the nest consists of small, medium and large in which the stingless bee preferred was medium sized entrance nest.

In selected survey area (Fig. 2) many nests were found facing towards north south and west hardly noticed one nest facing east which prove that bee species prefer dark condition. The active nests have just one entrance tube made of cerumen. The entrance of the nest may be simple hole, often extended from the nest as an external tube. The length of the entrance tube varies extensively. The bee entrance normally includes simple cracks



Fig. 4. Outer view of colony in stone wall.

Table 1. Different nesting attributes of the *T. irridipennis* at Haveli campus, Bagalkote.

Sl. No.	Attributes	Observation / criteria's	Most preferred
Nest characters			
1.	Size of nest opening	Small, medium, large	Medium sized
2.	Shape of nest opening	Circular, oval, irregular	Circular
3.	Nest height from ground	Reading in feet (0 -18 ft)	Middle elevation (4- 11 ft)
Nesting habitant			
1.	Places visited	Residential quarters, Educational buildings, Hostel, office, road side	Educational buildings, Residential quarters.
2.	Substratum (Habitat)		
1.	Wall	- Stone, mud brick, pillars, metallic sheath	Stones walls
2.	Water pipes	-Iron, cemented, plastic	
3.	Electrical pipes	-Electric box , lamppost, telephone wires	
4.	Wood	-Wooden : Door rim, Windows rim	
5.	Stare cases	-Cement plastering's	
6.	Floor	-Mud	

or holes about one cm on the walls of the buildings viz., education and residential buildings in the present study. Inactive nests on house walls were with small nest entrance with circular hole, surrounded by dark resin and with no outer tube. In a total of 99 nests, 15 nests are found active with excellent number of foragers. During survey it was recorded that, stingless bees preferred low light, high humidity and stenothermal climatic condition, education and residential buildings for nesting with diverse abundant flora. It was also noticed that stingless bees chosen medium sized nest opening with circular nest and 4 to 11 foot height from the ground (Table 1). The nest-site preferences are an adaptive response to fitness cost imposed by variation in nest-site microclimate and among the different nesting attributes (Nayak *et al.* 2013). The result of present study helps to commercialize the domestication of stingless bees in adjacent areas of Bagalkote due to their high adaptability and abundance.

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