REPUBLIC OF KENYA

KALRO
Kenya Agricultural & Livestock Research Organization

NAVCDP
National Agricultural Value Chain Development Project
*Transitioning from Subsistence to Commercial Farming*

# Stingless Bee Species and their Hives

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## Introduction

There are more than 12 stingless bee species in Kenya. Those commonly kept for honey production include; *Meliponula bocandei, Meliponula ferruginea-reddish, Meliponula togoensis, Meliponula lendliana, Plebeina hildebrandti* and *Hypotrigona gribodoi. Dactlurina schimidti*, a species found in the coastal region is an important pollinator of wild and crop plants, although it has not been domesticated for honey production.

*Meliponula bocandei, M. togoensis, M. ferruginea* nest in tree cavities, while *M. lendliana* and *P. hildebrandti* nest in underground cavities. *Plebeina hildebrandti* have been shown to nest near termite mounds. This means that, the stingless bee species have specific nest requirements.

## Stingless bee hives

A stingless bee hive, is the house/home for the domesticated stingless bees' colonies. The design of stingless bee hives is species specific; and various designs are available for various species. The design is dictated by the species brood cell construction behavior, some build horizontally while some build vertically.

Here we discuss the species and hives of stingless bee species that have been researched on and shown to have good honey production and the species which can adapt well even in areas where they are not naturally found.

### *1. Meliponula bocandei*

This is a large bodied bee about 5mm, almost the size of honeybee. It nests in indigenous trees in Kakamaga forest. It produces an average of 4 litres annually. It occupies large spaces and thus larger hives are required.

*Meliponula bocandei*
*Photo courtesy: Nelly Ndungu*


*ICIPE4M*

a. Brood cells
b. Food pots

*Photo: Kiatoko Nkoba*

*Meliponula bocandei* prefers this tree species for nesting including; *Antiaris toxicaria* (Upas tree, Sacking tree), *Croton megalocarpus* and *Syzygium guineense* (water pear).

*Antiaris toxicaria* (**Upas tree, Sacking tree**)
Source: https://images.app.goo.gl/8QD8Y2JCPygKkNRv8

*Croton megalocarpus* (Croton species)
Source: https://images.app.goo.gl/XAeSesEXVZwhURiF7

Syzygium guineense (water pear)
Source: https://images.app.goo.gl/fMPFqSg3RjazPaHz8

## 2. Meliponula ferruginea

*Meliponula ferruginea* is a medium sized bee approx. 3mm. They produce about 2 litres annually, however, production may increase or decrease depending on the availability of forage plants.

*Meliponula ferruginea. Photo credit: Nelly Ndungu*

*Meliponula ferruginea* prefers nesting in mud house walls that have been smoothened with cow dung thus are easily identified within homesteads.


*Photo credit: Kiatoko Nkoba thesis 2012*

This stingless bee can also be found nesting on tree species in the forest. The most preferred tree include; *Diospyras abyssinica* (Baforonto*),*

*Antiaris toxicaria* (**Upas tree, Sacking tree**) and dry Eucalyptus. *Meliponula ferruginea* can also nest underground in the farms or in the forest.

*Diospyras abyssinica*
*Photo credit: https://images.app.goo.gl/4GoTqMou83mLiqrR6*

*Antiaris toxicaria* (**Upas tree, Sacking tree**)
Source: https://images.app.goo.gl/8QD8Y2JCPygKkNRv8

### *Meliponula ferruginea* hives

*ICIPE 5M hive (left) and ICIPE 6M. Photo credit Nelly Ndungu*

### 3. *Hypotrigona* species

The *Hypotrigona* species, such as *Liotrigona* species, are the smallest stingless bee species, approx. 2mm in size. Their honey production capacity is therefore low giving 500ml annually. However, they are good pollinators of small sized flowers. The honey would cost higher than that of large sized bees.

*Hypotrigona species. Photo credit: Nelly Ndungu*

*Hypotrigona* species nest entrances that can be located during nest search. *Photo credit: Nelly Ndungu*

The *Hypotrigona* species prefer nesting on the mud walls but not smoothened, in trees and stone crevices. The *Hypotrigona* stingless bee nests usually show aggregation behaviour, where more than 5 nests can be located in one area. This are widely distributed species and can adapt to different weather conditions. *Hypotrigona* species have been shown to nest in *Diospyras abyssinica*.

*Diospyras abyssinica. Photo credit: https://images.app.goo.gl/4GoTqMou83mLiqrR6*

The ICIPE 1H, a small non compartmented hive are the best hive for this species.


*ICIPE 1H. Photo credit: Nelly Ndungu*

### *4. Plebeina hildebrandti*

The *P. hildebrandti* stingless bee is a medium sized bee similar to *M. lendiliana*. The two species nest underground cavities. *Plebeina hildebrandti* prefer nesting in termite mound, 1m in depth. The honey production is comparable to *M. ferruginea*, with approx. 2litres per annum.

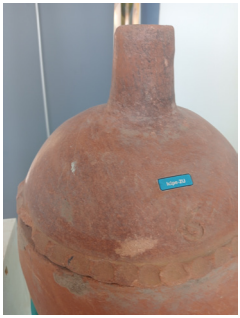
Plebeina hildebrandti / P. armata bee. *Photo credit: Nelly Ndungu*

***Plebeina hildebrandti* Nesting site**

Digging out *P. hildebrandti* nest in the termite hills. *Photo credit: Nelly Ndungu*

***P. hildebrandti* hive**

The pot has been designed to provide an environment close to that of underground, where *P. hildebrandti* nests.



*ICIPE 2U hive. Photo credit: Nelly Ndungu*

## Summary of stingless bee hives


Stingless bee species hives, ICIPE 1H-*Hypotrigona* species; ICIPE 3M, 4M, 5M, 6m, and 7M FOR *Meliponula* species.

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