

OP-187 [Beekeeping for Rural Development] Meliponiculture- An Additional Income in South India

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Meliponiculture, the rearing of Stingless bees for honey harvesting, is an eco-friendly and sustainable practice that has gained traction nowadays. Many beekeepers have turned to this practice, in addition to their conventional cerana beekeeping in South India. Stingless bees, belonging to the order Hymenoptera, of the family Apidae, classified further into 58 genera and 550 species, is widely distributed in the tropical and subtropical regions of Africa, Asia, Australia and America (Crane,1992). In India, the three species commonly found are Tetragonula, Lisotrigona, Lepidotrigona. The most widespread species in peninsular India is Tetragonula travancorica. Shanas and Faseeh, 2024. Since many centuries, traditional stingless beekeeping with indigenous bees, ie Tetragonula sp, has been the norm in South India and other parts of the country. Amongst the many shortcomings of this method, a few to be noted are its poor honey yield, with each colony contributing to just 100 to 300 grams and the unhygienic honey collection methods. The introduction of scientific management, with standardized beehives and accessories, raising awareness through workshops and trainings, stingless bee flora identification, establishment of bee gardens, and yield increase through pollination studies on vegetable and fruit crops has been undertaken to overcome such limitations. Additionally, other features that have facilitated the popularity of Meliponiculture amongst hobbyists and beekeepers are the abundance of its wild colonies in nature, easier management and its pathogen resistance. Moreover, it is easier to establish the hives in residential areas. Presently, beekeepers manage thousands of stingless bee colonies with each colony providing a yield of 500 grams to 1 kilogram of honey. We have observed that Kasargodu and Kannur in Kerala are the leading districts in Meliponiculture. With income generation through the sales of honey, bee colonies, pollen, value added products like Propolis cream, one can generate Rs 25000 to 30000/ from 10 Stingless bee colonies /year which serves as a sustainable income to the humble beekeeper. Key words: Stingless bees, Meliponiculture, Tetragonula, Lisotrigona, Lepidotrigona



MELIPONICULTURE



AN ADDITIONAL INCOME IN SOUTH INDIA



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INTRODUCTION

- Stingless bees belong to the order **Hymenoptera**, family **Apidae**, and are further classified into 58 genera and over 600 species worldwide (Crane, 1992; Shanas & Faseeh, 2024). They are widely distributed across the tropical and subtropical regions of **Africa, Asia, Australia, and America**.
- In India, the most common species include **Tetragonula, Lisotrigona, and Lepidotrigona**, with *Tetragonula travancorica* being the most widespread in peninsular India.
- **Meliponiculture** is the science of rearing stingless bees for their products—**honey, pollen, propolis**—and for their **pollination services**. These bees play a vital role in biodiversity conservation and agriculture. Unlike *Apis* bees, stingless bees lack functional stings, making them safe and easy to handle.

WHY MELIPONICULTURE IS IMPORTANT

- Meliponiculture became more popular amongst hobbyists and beekeepers due to
- The abundance of its wild colonies in nature
- Easier management and its pathogen resistance
- Easier to establish the hives in residential areas, urban and villages.

Presently, beekeepers manage thousands of stingless bee colonies with each colony providing a yield of 500 grams to 1 kilogram of honey in addition to their conventional cerana beekeeping in south india.

Honey is having high therapeutic value and fetch premium price of Rs 3000/-in kerala.

- Kasargodu and kannur in kerala are the leading districts in Meliponiculture.

WHY MELIPONICULTURE IS IMPORTANT-2

- Scientific management with standardized beehives and accessories
- Increased awareness through workshops and trainings
- Stingless bee flora identification
- Establishment of bee gardens
- Pollination studies on vegetable and fruit crops leading yield increase
- With income generation through the sales of honey, bee colonies, pollen, value added products like propolis cream, one can generate Rs 25000 to 30000/ from 10 stingless bee colonies /year
- Provides a sustainable income to the humble beekeeper
- Their role in sustaining forest ecosystems and ayurveda industry is unique.
- Forest-dependent communities, tribals, the poorest populations, rely on bees both directly (honey and by-products) and indirectly (ecosystem services).

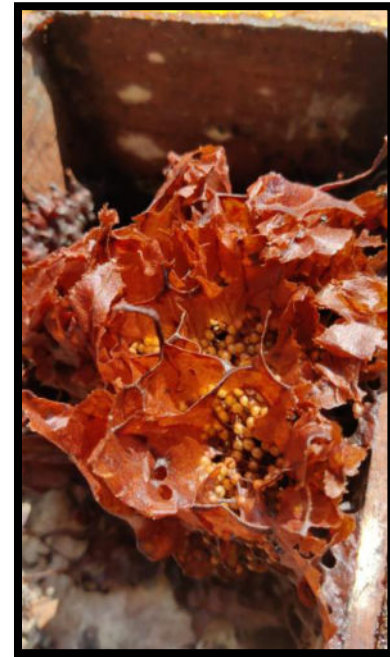
COLONY STRUCTURE AND NESTING

- Stingless bee colonies are naturally long-lived, ranging from a few hundred to several thousand bees depending on the species. They typically nest in **dark, enclosed spaces** such as hollow tree trunks, underground cavities, electric poles, or cracks in buildings.
- **Nest Structure:**
- **Entrance:** Narrow resin tubes of varying lengths, sealed at night with propolis to protect against predators like ants and beetles.
- **Brood cells:** Built horizontally, with workers, drones, and queens emerging from similar-sized cells. Queen cells are slightly larger and located at the brood edges.
- **Storage pots:** Made of cerumen (wax and resin) and used to store honey and pollen.
- **Other structures:** Waste dumps, resin deposits, supporting wax pillars.
- Unlike honeybees (*Apis*), which build vertical combs, stingless bees construct **horizontal brood layers**, sometimes arranged in concentric circles.

BROOD STRUCTURE



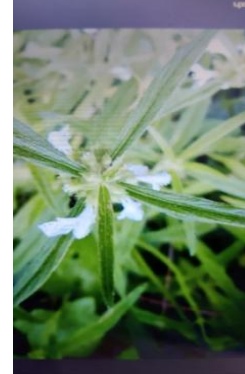
VARIATIONS IN BROOD COLOUR



FORAGING BEHAVIOUR

- Stingless bees forage within a radius of **0.5–1 km** from their nests. Their small body size (2–16 mm) allows them to exploit narrow floral structures inaccessible to honeybees. They collect nectar, pollen, and resins from:
- Garden and ornamental plants
- Medicinal herbs
- Agricultural and horticultural crops
- Spices and vegetables
- Avenue and forest trees
- Weeds and grasses
- They begin foraging in the early morning and contribute significantly to **crop pollination**, especially of small-flowered species.

MEDICINAL PLANTS



Ferula asafoetida (Hingu), (Mimosa pudica) Mimosa, Basil (Ocimum sanctum), Cassia (Cassia fistula), leucas (Leucas aspera),), (Elumbi) Avertroa blimbi, Tamarindus (Tamarindus indicus), Awla (Emblica officianalis) Passion fruit (Passiflora edulis) Dragon fruit (Selenicereus undatus)

BEE GARDEN



TRADITIONAL AND SCIENTIFIC MELIPONICULTURE

- For centuries, South Indian farmers and tribes have kept stingless bees in **log hives, coconut shells, bamboo, and earthen pots**. Modern meliponiculture has introduced **standardized wooden hives** (developed by CBRTI, Pune) that:
 - Allow easy division and honey extraction
 - Provide better pest control
 - Enable colony inspection without disturbance
- **Equipment:**
 - **Wooden hives:** Teak wood boxes with a volume of 1960 cc.
 - **Hive stands:** Iron supports to elevate colonies above ground, reducing pest and moisture problems.
 - **Honey extractor:** Stainless steel tray with UV cover for hygienic extraction.

TRADITIONAL STINGLESS BEEKEEPING



SCIENTIFIC MANAGEMENT OF STINGLESS BEES



EQUIPMENTS FOR STINGLESS BEES



COLONY MULTIPLICATION

- Colony division is an important method to increase stock.
- Select healthy colonies with abundant brood, honey, and pollen.
- Transfer brood, pollen, honey pots, and a queen/queen cell to a new hive.
- Move the new colony 1 km away to avoid forager confusion.
- Seal cracks with clay or cow dung to prevent invasion by ants or robber bees.
- If no queen cell is available, one can be grafted from another colony. Careful handling is required as **brood cells are soft and fragile**.

HONEY EXTRACTION FROM **BAMBOO IN MEGHALAYA**



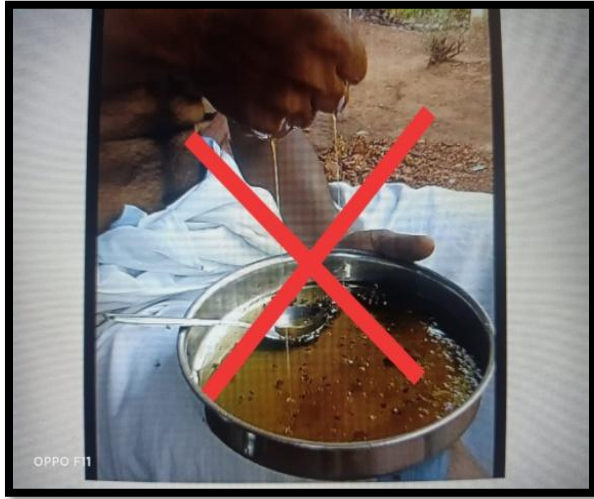
SCIENTIFIC METHOD OF COLONY MULTIPLICATION



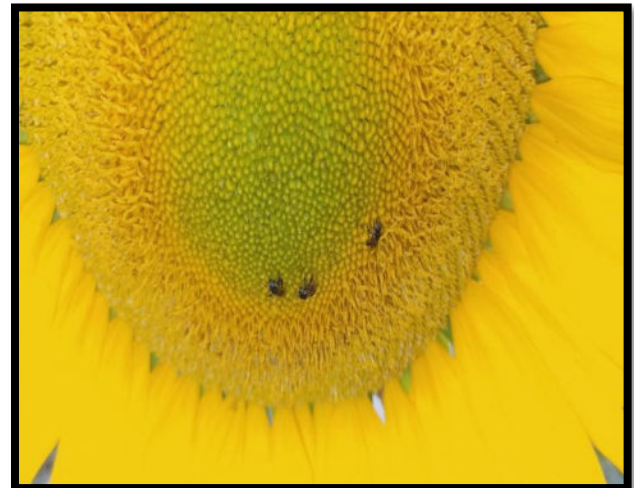
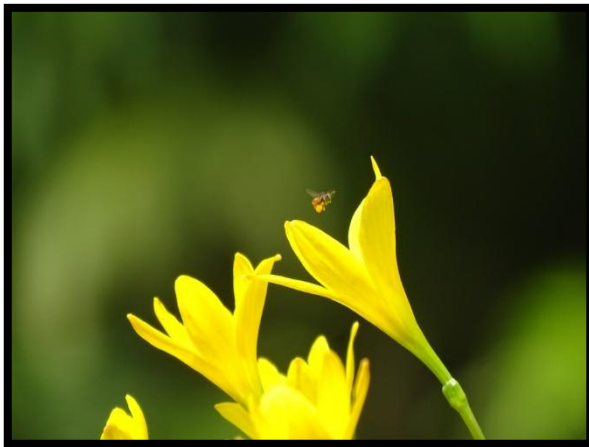
HONEY EXTRACTION

- Stingless bees yield **200–1200 g of honey per colony per year**, depending on species, flora, and management. Though much less than *Apis* bees, stingless bee honey is highly valued for its **unique taste (sweet-sour with citrus notes)** and **medicinal properties**.
- **Extraction methods:**
- Traditional squeezing of honey pots (less hygienic).
- Modern hygienic straining with sieves and solar exposure to burst pots.

HONEY EXTRACTION



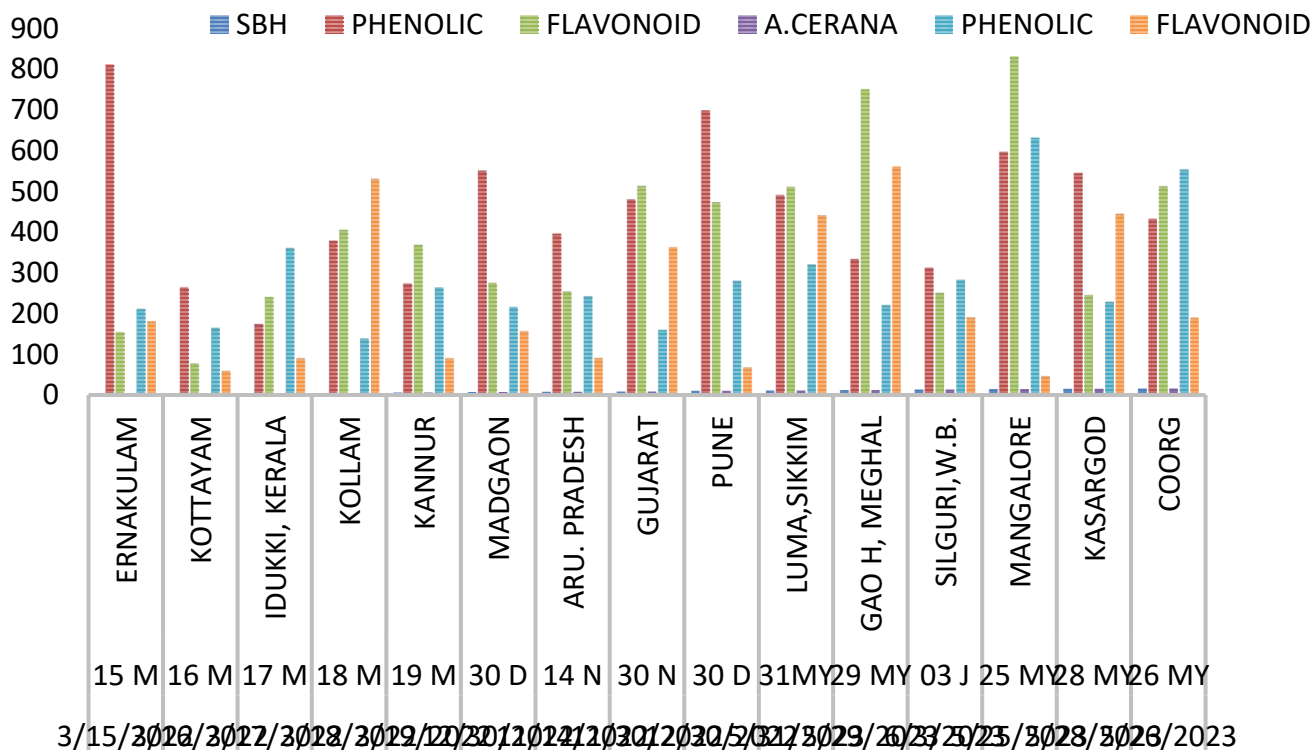
STINGLESS BEES CONSERVATION VARIOUS CROPS YIELD WILL INCREASED BY POLLINATION



MEDICINAL VALUE OF STINGLESS BEE HONEY

- Stingless bee honey (SBH) is widely used in **Ayurveda, Siddha, Unani, and folk medicine** for its **antimicrobial, antioxidant, and anti-inflammatory** properties. It contains sugars along with trace **minerals, vitamins, proteins, flavonoids, phenolic acids, enzymes, and organic acids**.
- **Traditional Uses:**
- Treatment of **eye infections, asthma, throat ailments, tuberculosis, ulcers, eczema, wounds, and burns**.
- Used as a **nutritive tonic** and in managing **diabetes, fatigue, and digestive disorders**.
- Its antioxidant potential depends on **floral source, geography, climate, and season** (Cowan, 1999; Baltrusaityte et al., 2007).

COMPARATIVE STUDY OF STINGLESS BEE HONEY AND APIS CERANA HONEY



ADVANTAGES OF MELIPONICULTURE

- Colonies are **non-aggressive** and do not abscond easily.
- Bees lack stings, making them safe for handling by all age groups.
- Ability to access **tiny medicinal flowers** missed by *Apis* bees.
- Excellent **pollinators** of fruits, vegetables, ornamentals, and forest flora.
- Production of **propolis** in abundance, collected from neem, mango, jackfruit, etc.
- Natural defence by sealing nests with resin and propolis.
- **Low-cost beekeeping** using locally available materials (bamboo, coconut shells, PVC pipes, etc.).
- Colonies require **little space** and can be kept in **gardens, terraces, or window grills**.
- Easy transport and shifting, even during daytime.
- Honey has **high therapeutic value** and fetches **premium market prices**.
- Stingless bees support **plant biodiversity conservation**.
- Ideal for **rural households, urban gardeners, and tribal communities** as a **supplementary income source**.

CONCLUSION

- Meliponiculture represents a **sustainable, eco-friendly, and profitable livelihood option** for rural and urban households in South India. Beyond income, stingless bees ensure **biodiversity conservation, pollination of food crops, and production of highly medicinal honey**.
- .and With scientific management, modern hive technology, and proper awareness, stingless beekeeping can greatly contribute to **rural development, food security, and environmental sustainability**.
- Along with A cerana Stingless bees can also be domesticated for medicinal honey and good income

THANK YOU

