

Traditional beekeeping of stingless bee (*Trigona* sp) by *Kani* tribes of Western Ghats, Tamil Nadu, India

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In India honey bees like *Apis cerana* and *Apis mellifera* are reared for commercial purpose. The other bees like rock bee (*Apis dorsata*), little bee (*Apis florea*) and dammer bee (*Trigona* sp) are not domesticated because of their ecophysiology. However, the *kani* tribes living in Karayar area of Kalakad- Mundanthurai Tiger Reserve area (KMTR) of Western Ghats have developed a novel method of rearing the dammer bees. The objective of the study is to understand the traditional skill of *Kani* tribes to rear the stingless bee (*Trigona* sp.) which was not used for regular bee keeping. The present study also gives importance to evolve commercial strategies to get honey (medicinal honey) from *Trigona* sp. The findings of the present study will help to preserve the art of rearing stingless bees and to introduce modern techniques to harvest pure, clean and uncontaminated honey by suitable modifications in the indigenous practice of stingless bee rearing. The honey produced by dammer bees is a panacea for much human illness. The *Kani* tribes have developed a bamboo pole bee hive to keep this stingless bee belonged to the species *Trigona irredipensis*. The dammer bees build an interesting type of comb made of propolis, mud and about 600-700gm honey is collected per year per hive. Because of rich medicinal value the honey collected from this beehive is sold at a rate of Rs.1000/Kg.

Keywords: Bee Keeping, *Trigona* sp. *Kani* tribes, Bamboo pole bee hive, Dammer bee, Stingless bee

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Asia has a poorer bee fauna compared with other biogeographical regions and lower diversity compared to the Neotropics, but in terms of abundance the social apid bees (Apoidae: *Apidae*) are the most numerous in the pollinator spectrum^{1,2}. Honey is a energy rich medicinal product produced by different species of honey bees. Honey bees include stinged and stingless bees. Normally honey is obtained from the species *Apis dorsata*, *Apis florea*, *Apis cerana* and Italian bee, *Apis mellifera*. As *Apis dorsata* is a wild rock bee and it can't be domesticated, the beekeepers rear *Apis cerana* and *Apis mellifera*³⁻⁵. Tribal peoples living in Western Ghats are successfully rearing stingless bees which cannot be reared in the popular modern bee hives. The stingless bees are small (a few mm in length) and resident species which nest among boulders, old walls, dead trees and tree cavities; they are widely distributed in tropical and temperate regions of the world^{6,7}. The *kani* tribes are using a very peculiar bee hive to rear these bees,

which are normally wild. The honey produced by *Trigona* sp is highly medicinal and it has a very good market demand. It is about 20 times costlier than the honey produced by other bees. Hence in the present study, an attempt has been made to study the technology used by *Kani* tribes to rear *Trigona* sp.

Methodology

The methodology used by the *Kani* tribes to rear stingless bees was studied in detail. For studying stingless bees, periodic visits were made to three *Kani* tribes settlement (*Kanikudiyiruppu*, *Mayilar* and *Periyamayilar*) Karayar area of Kalakad - Mundanthurai Tiger reserve (KMTR) area of Western Ghats. Kalakkad - Mundanthurai Tiger reserve is in Tirunelveli district, Tamil Nadu. It is located between latitude 8° 25' and 8°53' N and longitude 77°10' and 77°35'E. For getting information and to study the traditional art of stingless bee keeping ,six families were interviewed. Prior permission were sought from these tribes after consultation with the village Head (Mootukani).The *Kani* tribes in this forest are one of

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the primitive peoples settled in this area. There are five tribal settlements in the area (*Servalar*, *Kanikudiyiruppu*, *Mayilar*, *Periyamayilar* and *Inchikuzhi*). In this tribal settlement, few *Kani* tribal families are maintaining *Trigona* colonies in their home. However, one Mr Sankar *kani* is rearing this bee for over 30 yrs. The various features of their technology to rear *Trigona sp* was studied in detail.

Trigona irredipensis is a common wild honey bee in Western Ghats area. The honey stored by these insects is highly medicinal. Due to the low yield of honey and wild nature, *Trigona sp* is not reared for commercial purpose. However, the *Kani* tribes had developed some indigenous technology to rear these bees and sell honey for a good price.

Results and discussion

Natural bee hive of stingless bee

Normally the stingless bees built their nest on trunk of trees, logs, wall crevices (Fig.1) and under the roof of dwellings. Stingless bees mix the plant resin with wax to construct the entrance of the nest and also coat the resins over the hive to protect it from their enemies like ants and wasps. Majority of these bees prefer teak trees for building their hives. Teak tree maintains temperature and humidity at a optimum level, so that it prefers teak tree (*Tectona grandis*.Linn.f). In the natural settlement, the nest arrangement of this bee is very peculiar. This nest is entirely different from the other hives honey bees. The unique feature of this nest is its multilayer arrangement. In the nest has different chambers are arranged in the following order, viz. pollen storage chamber (food chamber), honey storage chamber and brood rearing chamber. The combs are built in a horizontal or vertical pattern in the trunk of the tree. The four chambers are interconnected and the bees enter through a single opening. Stinglessbees usually swarm once (June-July) in a year and during that period their hive disappears in the trees.

They use a variety of adhesives collected from various plants in the form resins (propolis) for build up nests. Propolis were collected from *kongu*, *nangu*, mango tree, jack fruit and *mayilamaram*. Resins are rigid and semisolid. Important bee forage include: *Thottal vadi* (*Mimosa pudica*), *Thumbai* (*Leucas aspera*), *Tirnirupachai* (*Ocimum sanctum*) and *Tridax procumbents*, etc. They live in a complex colony. A colony generally contains a queen bee, drone bees and worker bees.

The main problem in domesticating stingless bees during transferring from traditional hives to the modern hives is either they abscond or the bees built comb between the frame and inner side of bee hive box. So, *Kani* tribes had developed a technology to rear this bee successfully.

Indigenous bee hive developed by Kani tribes

Kani Kudieruppu is the area inhabited by *Kani* tribes. More than 50yrs Kanikars in Western Ghats practice *Trigona* beekeeping. This bee keeping method is rare and not commonly practiced by any other tribes of our India. The following is a description of the method employed by the *Kani*.

Kani's method of rearing *Trigona sp*

Trigona irredipensis reared in hollow trunks of bamboo tree. Bamboo stem with a diameter of 30 -35 cm were chosen. The length of the bamboo hive is 80-85 cm. The stem of the bamboo is split into two halves and the two halves are tightly joined with the help of ropes. The joined bamboo stem has a narrow gap in the middle for the entry of the bees. Both ends of the bamboo stem are sealed. The tied log is opened into two halves then transfers the brood chamber into bamboo log. After 2 hrs, the colony settled completely inside the bamboo pole well. Bamboo log is closed and tied with ropes in both edges and the openings at the end are sealed. The bamboo pole with the bees are taken to the home and tied below the roof of the hut (Fig.2). The bees inside the bamboo poles start moving outside through the narrow gap left in the middle. The bees make the entrance smooth (Fig.3) by depositing resins (propolis) collected from trees and their wax. They live in complex colonies. A colony generally contains a queen bee, drone bees and worker bees (Fig.4). In the month of June to July (South West Monsoon season), the bees store honey to the maximum. A single colony produces 600-700gm/yr. When the bamboo hive is loaded with honey, the tribes open the pole (Fig.5). In the bee hive three chambers (brood rearing chamber, pollen storage chamber (food chamber) and honey storage chamber) are interconnected (Figs.6 & 7). From the hives, the tribes remove the honey storage pots only (not like hexagonal combs) crushed in a white cloth, filtered and then bottled. This honey has a different colour, odour and taste. The components of the honey are different from the honey obtained from other bees. This honey is highly medicinal and has good demand. Stingless bees also a important pollinator.



Fig. 1—Bee hive in wall crevices; Fig. 2—Bamboo hive below the roof of the hut; Fig. 3—Bee entrance of the bamboo hive; Fig. 4—Different caste of bees; Fig. 5—Kanikar opening the bamboo pole into two halves; Fig. 6—Three chambers are interconnected in the bamboo hive; Fig. 7—Multilayer arrangements in bamboo hive

This indigenous method to domesticate a wild bee is very interesting and this can be recommended to government and other non-government institutions to follow. This will also help to conserve the endangered stingless bees.

Conclusion

The tribal people use bamboo hive for artificial rearing of stingless bees. The artificial bee hive made up of a splitted bamboo pole. In the cavity of a pole, the bee is allowed to build the colony. It was observed that the nest build by the bee has multilayer arrangement; viz. the pollen chamber (food chamber), honey storage chamber and brood rearing chamber are distinctly seen one below the other. On artificial rearing a single colony was found to produce 600-700gm/yr in the bamboo bee hive. This indigenous method of domesticating the wild stingless bee is really fascinating. The significance of the present investigation is to highlight the art of rearing stingless bees by the tribal people and to evolve a modern method of beekeeping by modifying the existing technology. The honey collected from this hive is sold at a good rate. The tribes keep this hive in their home roof. Proper science and technology intervention in this traditional bee keeping will help to produce a high amount honey with medicinal value and the tribal people can augment their income. This

will be a good livelihood option for many rural people. Tribes believe that the honey of stingless bees cures many infections and it is a weaning food for babies. Further research on the medicinal property of honey and propolis collected from this bee hive will help to find a solution for many ailments.

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