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Research Article

Propagating *Trigona iridipennis* Colonies (Apidae: Meliponini) By Eduction Method

K. Vijayakumar[1]*, M. Muthuraman[1] and R.Jayaraj[2]
[1]Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore-641 003, India.
[2]Department of Zoology, Kongu Nadu Arts and Science College, Coimbatore-641029, Tamil Nadu, India.

Corresponding author
K. Vijayakumar
Email: knvijgs@gmail.com

Abstract: Meliponiculture is an activity that can contribute to the regeneration of the natural forest vegetation and to an increase in agricultural production through pollination services by the stingless bees. Stingless bee colonies were captured from wall or tree cavities in traditional way and survival rate of the captured colonies was less. Natural colony duplication method is an alternate method for splitting method for propagating stingless bees. The purpose of the study to extracting a new hive from a parent colony located in an immovable object. The eduction method is succeeded based on the part of time and patience, because it takes few months or even the time of the year.
Keywords: Meliponiculture, colony duplication, eduction, propagation

INTRODUCTION

Stingless bees are distributed throughout the tropical and subtropical parts of the Afrotropical, Australasian, Indo-Malayan and Neotropical Regions, exhibiting greatest abundance in New World Amazonian rain forest [1-4]. Stingless bees are major pollinators in the garden and orchard. The honey is used as a food supplement and as a medicine for colds, coughs and fevers. The price of *Trigona* honey is twice that of honey from honeybees. The usual way of harvesting honey from a natural nest of *Trigona* disturbs the colony because of the destruction of al large portion of the nest. It takes time and energy for the bees to mend the damage.

Nests of stingless bees mostly found on cavities tree trunk, old walls, inside the termite mounds and subterranean cavities [5-7]. The social biology of stingless bees is different from honey bees. They reproduce through swarming process. During the swarm process in stingless bees, workers from the mother nest choose a new cavity and start to prepare it by cleaning and bringing nest material from the mother nest. When the new nest is ready, more workers fly together with a virgin queen, which will perform the nuptial flight soon after arriving at the new nest.

In honey bees the old mature queen suddenly leaves the original nest with a huge swarm of worker bees. Scout bees locate a suitable empty cavity inside a hollow tree or in a building. Then the whole swarm moves in and begins constructing a new nest. In the stingless bee colonies, worker bees spend many weeks gradually constructing a new nest inside a nearby hollow tree. Then when the nest is nearly finished a young, newly mated queen moves in with some worker bees to complete the new nest. In honey bees, the beekeeper may start a new hive simply by catching a swarm and placing it in an empty bee hive. This does not work with stingless bee colonies.

Thousands of stingless bee nests are also destroyed each year by clearing of terrestrial and arboreal sites for various purposes. Some methods for rescuing and transferring stingless bee colonies from felling tree trunks or old wall cavities. The method of hiving stingless bee colonies (*T.iridipennis*) both from wall cavities and tree cavities was reported by various authors [8, 9]. Of late methods have been standardized for multiplying stingless bee colonies through colony division. Two types of nest splitting *viz.*, vertical splitting and horizontal splitting are advocated for multiplying the colonies [10].

The eduction method is an alternate method for splitting method for propagating stingless bee colonies. The new hives were developed from an existing nest in a tree or wall that cannot felled or demolished The role of this method is extracting a new hive from parent colony located at immovable object. It require more time and patience than splitting method, eduction method can be also used as a means of propagating artificial hives. In this an existing nest in a wall or tree cannot be felled or demolished. The original nest remains intact and the duplication method can be repeated year after year.

MATERIALS AND METHODS

The study was carried in stingless bee nests habitat at tree trunk, old wall cavity and rock cervices at Nellithurai (11°. 18' N/ 76°.55' E), Tamil Nadu, India and these areas show a relative high density of nests of *T.iridipennis*. The river Bhavani is the major perennial water sources used for irrigation. The banana fields are

intercropped with coconut plantation, so the coconut plants provide both nectar and pollen to the bees annually. The annual rainfall of 830 mm and the mean maximum and minimum temperature are 32.2^{o}C and 23.2^{o}C respectively. Wooden box with suitable dimension (20X10X10cm) was used in this study. The present study was carried out during June 2011 to May 2012.

RESULTS AND DISCUSSION

Strong and active colonies were selected based on the forager strength. The entrance tube of the colony was carefully removed by pin prick method and properly fixed a black plastic tube (10 mm diameter) in the original position of the entrance and forced all incoming and outgoing foragers through the newly fitted plastic entrance hole (Plate 1a). The entrance of the old nest was carefully fixed the tip of the plastic tube, so that the bees were easily identified the scent of the old entrance tube. The pheromone of the new hive deposited in and around the entrance and acting as guiding light in front door and minimizes the disruption of bees. The bees were easily relocate the nest entrance and minimized the disruption. After a week time, the old entrance tube was removed from the tip of the tube and a newly fabricated a wooden box hive (20X10X10cm) using 15 mm thick wooden plank with two 20 mm entrance holes in the centre of both front and back panel was attached into the original position of the parent colony. Provide proper support to place the box hive closer to the feral colony (Plate 1b). All bees were leaving from the original nest was forced to walk into the annexure hive and out through the newly fitted plastic entrance hole. The gaps and cervices are completely sealed, so that the bees cannot escape from the tube without going through the annexure hive.

Plate-1: Natural colony duplication or eduction study

Initially, bees from three colonies were used the extra space available inside the annexure hive for storing wastes and also started to build unusual cerumen layers behind the entrance. The diluted honey (1:1) in mud lamp feeder (Plate 1c) and cluster of pollen pots introduced to the annexure hive for lure the bees from parent colony into the annexed hive. Initially, artificial honey was taken into the parent nest and stored inside and introduction of some of food pots and brood cells has certainly accelerated their building activity. These conditions often encourage considerable expansion of the brood nest. These conditions persist the colony growth in strength at a fairly rapid rate and subsequently raised the temperature of the brood nest. The increased worker population and raised brood nest temperature results group of worker bees stayed empty space of the annexure. Also the bees started to initiate the construction of food stores. Subsequently the bees stored their excess food to the annexure hive. A matured queen cell with worker brood from a strong and active colony was given to the annexure hive. The nurse bees in the annexure hive started to construct brood cells for the mated young queen (Plate 1d). The study area with suitable abundant food resources with suitable climate the bees from a strong and active colony produce daughter colony within three to five month and if the unsuitable environmental condition and lack of food resources the colony will take a year or more or may fail to produce daughter colony.

Carefully detached the annexure hive from parent colony and completely sealed holes of the annexure. The sealed daughter colony was shifted to a new location after dusk. The careful management and monitoring the progress of the colony will help the success of the daughter colony. The success of the eduction based on the various age group worker population and larval pupal cells present in daughter colony.

The eduction study was carried out during period of very good food supply, especially pollen, the bees may well be predisposed to build brood cells for laying queen and this may be the key factor in its achievement. The space provided in the new hive will be accepted and utilized only when there is scarcity of space for further nest expansion inside the feral colony.

In this method, the natural stingless bee colonies were not disturbed. There is no damage caused to the wall or tree. When the opening of natural nest the brood may become chilled or dried and powdery sawdust or soil particles spoiled the brood nest and food stores. The damaged brood cells and food pots may provide accommodation for pests and predators. In this method the bees were established the batumen coat around the nest. This method is requiring more time and more patience. The hive set up should not be disturbed until the colony moves into the annexure. There is a possibility of hive theft before the process is completed if the area lacks security.

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