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Colony Division Techniques for Stingless Bee, *Tetragonula iridipennis* (Smith)

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ABSTRACT

Beekeeping is one of the best suitable occupations and a novel method of harnessing the non-timber forest products. Among the different species of honeybees, now a days the maintenance of stingless bees, the Meliponiculture is gaining popularity owing to its honey with high medicinal properties and its increasing demand for ayurvedic medicinal products. Meliponiculture is being followed in traditional ways by many of the forest dwellers and through some improved methods by the others, even then, there are no standardized techniques in the practice. An attempt was made to find out the suitable method for dividing the stingless bee colonies, one of the important practice in Meliponiculture. Different techniques including the methods which are in vogue among the beekeepers in respect to the other related species of stingless bees were followed to study their suitability in splitting the Tetragonula iridipennis colonies. Among the various methods tried the success rate ranged from 0.00 to 100 per cent with the minimum being in separation of brood without queen cells or gynes and the maximum in parallel method with the presence of gynes. Success rate of 86.66 per cent was found in case of parallel method with the presence of queen cells. In case of separation of brood with the presence of gynes, the success rate was 85.71per cent. Whenever the brood with gynes were separated and kept apart, the success rate was 85.70 per cent, followed by separation of brood with queen cells (75%). The budding method recorded the success rate of 60 per cent.

Key words: *Tetragonula iridipennis, Gynes, Budding method, Queen cells*

INTRODUCTION

Stingless bees are important for pollination of cultivated and wild plants (Heard 1999)[3]. They also produce highly valued honey that communities use to treat various ailments. The other advantages of stingless bees include, they can be managed very easily, there is no much of absconding tendency and they can survive on little resources. There is a lot of scope to do diversification in Meliponiculture through the production or harvest of pollen and propolis. One of the major constraints for Meliponiculture is the non-availability of colonies to the interested people.

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Most of the time the feral colonies are seen in cavities from where they cannot be hired. Hence, to increase the number of colonies the only better option is the division of the existing colonies.

The Meliponiculture is gradually gaining popularity and there are no standardized practices to manage the colonies. Dividing of the colony is also one of the important practices many people follow the crude method to divide their colonies which results in reduced success rate. Further the colonies which are transferred to hives from their natural sites later would able to develop completely and multiply naturally, if such colonies are not divided, swarming of the colony would take place and lead to the loss of the colonies. Hence the present investigation was aimed to study the best method of colony division in order to increase their numbers.

MATERIAL AND METHODS

The present investigation was carried out at the college of Forestry, Ponnampet, Karnataka, India during the year 2017-18. Known numbers of colonies were divided by following different methods (explained below) and the success rate (i.e. Development of queen and continuation of the divided part) was worked out in each of the method.

Method 1:-Parallel division with the presence of gynes in the divided part:-

The colonies maintained in hives made up of two rectangular halves, was selected, when there was presence of gynes and queen cells in the colony; the colony was divided into two equal parts, by separating the two halves with the brood and bees in them. Each of the separated part was provided with similar sized empty halves (for one halve below and for the other on the above) to make the hive a complete set of two halves. Once they were separated both of them (part having the parent queen and the part having the gynes) were placed parallel to each other within a distance of 5 cm. (Plate 1)

Method 2:-Parallel division with the presence of queen cells in the divided part:-

Similar method explained above was followed except for the gynes, there were queen cells in the divided part. (Plate 1)

Method 3:-Separation of brood with the presence of gynes in the divided colony:-

Well-developed colonies in which there was presence of gynes were selected, brood (approximately volume of about 200-250cm^3) along with the adhering bees, and gynes were taken out and placed in a new hive. The new hive was placed separately away from the parent colony, at a distance of about 5 meters. (Plate 2)

Method 4:-Separation of brood with the presence of Queen cells in the divided colony:-

The colonies were divided as explained in the method 3 above, but instead of gynes, the queen cells were there in the divided part. (Plate 2)

Method 5:- Separation of brood without the presence of gynes or queen cells in the divided colony:-

The colony were divided as explained in the method 3 except for the presence of either queen cells or gynes in the divided part. (Plate 4)

Method 6:- Budding method of colony division:-

Well- developed colonies maintained in rectangular shaped boxes were selected and empty boxes with the same shape and size were placed in front of the parent colony, provision was made for movement of foragers through the empty box by drilling a hole on the back of the empty hive in such a way that, the bored hole was exactly fitting to the entrance of the parent colony. (Plate 3)

Plate **1:- Parallel method of colony division with the presence of Gynes and queencells**

Plate 2:- Separation of brood with the presence of gynes and queen cells

Plate 3:- Budding method of colony division

Plate 4:- Separation of brood without the presence of gynes and queen cells

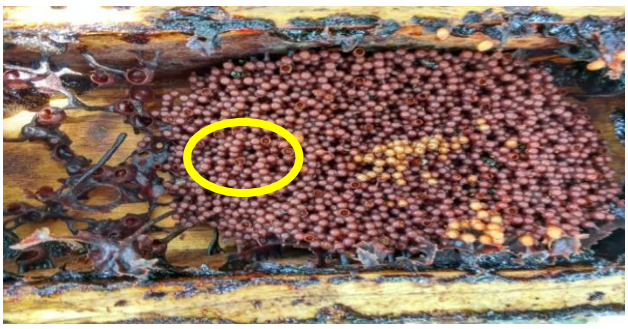

Plate 5:- Presence of queen cell

Plate 6:- Presence of gynes

RESULT AND DISCUSSION

A total of 50 colonies were subjected to division by following six different methods out of this 38 nucleus colonies were developed successfully (Table 1). The rate of success was highest (100%) in a parallel division with gynes, where in all the 10 divided parts of the colonies developed into new colonies. The second highest per cent success (85.66%) was observed in parallel division with queen cells, followed by separation of brood with gynes (85.71%). Separation of brood with queen cells recorded 75 per cent success and it was 60 per cent in the budding method.

There was no development of queen or successful development of the nucleus colony in none of the colonies where separation of brood was made without queen cells or gynes. Among all the methods followed, successful development of nucleus colonies was observed in a period of one month except in budding method which took about four months for development.

Heard[2] has obtained varying rate of success by dividing the stingless bee, *Trigona carbonaria* colony at different seasons. The method followed by him was separation of half of the brood from well-developed colony and keeping it at one Km away from the parent colony. According to him, the success rate was high during the months of March, April, October and there was no success during the months of November and December.

In the present investigation high success was obtained in the divided nucleus colonies with the presence of gynes and / or queen; and without them the success rate was zero per cent. Indirectly the findings of Heard[2] are in conformity with the present observation, as the success in his studies was obtained only during certain seasons which seemed to be the season of development of natural queen cells or gynes in the colony.

Similarly Michener[4] has also opined that, active growing periods of colonies are best for splitting them as the chances of colonies hiving queen cells or gynes is more during the active seasons.

Vijay Kumar *et al*.[5] and Anne dollin[1] have reported the development of new colony in a period of about 3-4 months in eduction method. The budding method followed in the present study which is similar to the eduction method also took four months for complete development as a new colony.

Table 1:- The success rate of colony division under different methods

Sl. No.	Dividing methods	Number of colonies		Percentage of success
		Divided	Succeeded	
1	Parallel division with the Gynes	10	10	100
2	Parallel division with Queen cells	15	13	85.66
3	Separation of brood with Gynes	7	6	85.71
4	Separation of brood with queen cells	8	6	75
5	Separation of brood without queen cell or Gynes	5	0	0
6	Budding method	5	3	60
	Total	50	38	76

CONCLUSION

From the present investigation it may be implied that the stingless bee colonies may divided successfully, whenever there is presence of queen cells or gynes. Parallel division or even separation of brood; with the presence of gynes or queen cells can be followed while developing the nucleus colonies.

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