

Chapter 4

Approach for the Domestication and Propagation of Stingless Bees

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ABSTRACT

*Domestication and propagation in stingless bees is called meliponiculture. The aims of meliponiculture are to make it easier to control the colonies health and development and to make it easy when harvesting stingless bee products (honey, bee bread, and propolis), furthermore, for advanced study and development like multiple colonies, to produce honey, bee bread, and propolis. Therefore, this paper focuswa on stingless bees *Tetragonula laeviceps*: the domestication and propagation technique, production of stingless bee products (honey, bee bread, and propolis), the daily activity of workers (foragers), the chemical composition (glucose, fructose, sucrose, reducing sugar, moisture, protein, ash, phenolic, flavonoid, vitamin C, antioxidant activity, minerals content, and amino acids) of honey from *T. laeviceps*, the pests and the challenges in meliponiculture of stingless bees.*

INTRODUCTION

The stingless bees are eusocial bees and include the tropical group, whereas the number of species have been identified are 500 species and possibly more than 100 species yet undescribed. The stingless bees include family Apidae, sub-family Apinae, and

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tribe Meliponini. In tropical regions of the world, they are divided into three zones are the American tropics (Neotropics), sub-Saharan African (Afrotropical region), and the Indoaustralian (Austroasian) region (Michener, 2007; 2013). In Indonesia, the stingless bees species at least 46 species from genus *Austroplebeia* Moure, *Geniotrigona* Moure, *Heterotrigona* Schwarz, *Homotrigona* Moure, *Lepidotrigona* Schwarz, *Lisotrigona* Moure, *Papuatrigona* Michener and Sakagami, *Pariotrigona* Moure, *Tetragonula* Moure, and *Wallacetrigona* Engel and Rasmussen which are spread in several islands like Sumatera, Java, Timor, Borneo, Sulawesi, Ambon, Maluku, and Irian Jaya (Papua) (Kahono et al., 2018).

Stingless bees species in Indonesia are *Austroplebeia cincta*, *Geniotrigona lacteifasciata*, *G. thoracica*, *Heterotrigona erythrogastra*, *H. itama*, *Platytrigona flaviventris*, *P. hobbyi*, *P. keyensis*, *P. lamingtonia*, *P. planifrons*, *Sahulotrigona atricornis*, *Sundatrigona lieftincki*, *S. moorei*, *Homotrigona aliciae*, *H. anamitica*, *H. fimbriata*, *Lophotrigona canifrons*, *Odontotrigona haematoptera*, *Tetrigona apicalis*, *T. binghami*, *T. vidua*, *Lepidotrigona javanica*, *L. latebalteata*, *L. nitidiventris*, *L. terminata*, *L. trochanterica*, *L. ventralis*, *Lisotrigona cacciae*, *Papuatrigona genalis*, *Pariotrigona pendleburyi*, *Tetragonula atripes*, *T. collina*, *T. fuscibasis*, *Tetragonula biroi*, *T. clypearis*, *T. drescheri*, *T. fuscobalteata*, *T. geissleri*, *T. laeviceps*, *T. melanocephala*, *T. melina*, *T. minangkabau*, *T. reepeni*, *T. sapiens*, *T. sarawakensis*, and *Wallacetrigona incisa* (Kahono et al., 2018). In addition, the recently reported that the seven species of stingless bees found in the Special Region of Yogyakarta are *T. laeviceps*, *T. biroi*, *T. sapiens*, *T. iridipennis*, *T. sarawakensis*, *Lepidotrigona terminata*, and *Heterotrigona itama* (Trianto & Purwanto, 2020).

Furthermore, the *T. laeviceps* is a species whose distribution in Indonesia is quite large, whereas all the islands are covered (Kahono et al., 2018). In Indonesia, stingless bees can be found in the forest, plantations, and they create the nest in wood or tree trunk, bamboo, sugar palm stalks, and in the ground. Especially stingless bee *Tetragonula laeviceps* can be found nesting in bamboo, wood or tree trunk, and in the ground (Agus et al., 2019a,b; Agusalim et al., 2019a; 2015). Therefore, this paper is focused on stingless bee *T. laeviceps*: the domestication and propagation technique, production of stingless bee products, the daily activity of workers (foragers), the chemical composition of honey, the pests, and the challenges in meliponiculture.

DOMESTICATION AND PROPAGATION TECHNIQUE

Domestication in our research focused on the stingless bee *T. laeviceps* and the natural hive is obtained from the bamboo hives from the plantation in Yogyakarta, Indonesia and the domestication process can be shown in Figure 1.

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