Chapter 10
Palynology of *Heterotrigona itama*

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ABSTRACT

Meliponiculture is the practice of handling the stingless bee for a lot of beneficial products including honey, bee bread, and propolis. Heterotrigona itama is one of the most cultured species by bee keepers in Malaysia. This research objective was pollen identification from pollen pot of H. itama. Five colonies of H. itama were observed from September 2014 until August 2015 for the foraging and pollen collection. Meanwhile, for palynology studies, the pollen sampling was done for four periods, which are September 2014, December 2014, March 2015, and June 2015. from three districts: Jeli, Kota Bharu, and Tanah Merah. One Way ANOVA was conducted, and results showed significant difference, $p<0.05$ for pollen area, pollen height of pot, pollen diameter, honey area, honey, honey diameter pot, honey height of pot, honey number of pot, and amount of honey. A total of 17,097 pollen were counted based on 66 species of identified pollen within 37 families. There was significant difference between locations and sampling period. The different geographical ranges determine various types of pollen.

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PALYNOLOGY

Stingless bees are responsible for pollinating agents for many flowering plants and foraging pollen and nectar for food. Recently in Thailand, a melissopalynological analysis was carried out by examining 72 *Tetragonula pagdeni* honey samples obtained from different locations (Thakodee et al., 2018). This study aimed to identify the principal food sources (botanical origin) used by Sakagami et al., (1983) for honey production. The pollen grains were harvested from the honey samples and preserved in glycerin jelly and absolute ethanol for light microscopy (LM) and scanning electron microscopy (SEM) observation, respectively. In brief, 300 pollen grains per sample were counted, identified and compared with the pollen source catalogues of flowers. Morphological characteristics are symmetry, shape, polarity, apertural pattern, exine and ornamentation were determined. The study revealed that the rambutan (*Nephelium lappaceum*) was the dominant pollen type in all sampling locations. Then, pollen from foxtail palm, (*Wodyetia bifurcate*), coconut (*Cocos nucifera*) and sensitive plant (*Mimosa pudica*) are abundantly found in the honey samples. Meanwhile, pollen types of *Asystasia gangetica* (Acanthaceae), *Amaranthus lividus* (Amaranthaceae), *Areca catechu* (Arecaceae), *Chromolaena odorata* (Asteraceae) and *Durio zibethinus* (Malvaceae) were also found in the *T. pagdeni* honey.

On the other hand, the author elucidates that the stingless and honey bees are attracted to the aromatic scent of male and female rambutan's flowers. In general, stingless bees are known as major pollinators of palm trees, whereas palm trees sourced a good nectar for stingless bees. Thus, it was explained that the pollen from foxtail, coconut and *Areca catechu* in the *T. pagdeni* honey.

The stingless bees usually forage the food during day time. In this study, they found a smaller amount of durian (*D. zibethinus*) pollen in the *T. pagdeni* honey. However, this kind of tree are planted in everywhere around the experimental area (Thakodee et al., 2018). This is because, the durian flowers blooming at night which serve and attract the nocturnal pollinator such as bad and insects. Remarkably, during the dearth of the fruits or agricultural plants the stingless bees in general alter their food source and foraging the weeds. For example, *Asystasia gangetica* (Acanthaceae), *Amaranthus lividus* (Amaranthaceae), *Chromolaena odorata* and *Mikania cordata* (Asteraceae), *Mimosa pudica* (Fabaceae) and *Pennisetum pedicellarum* (Poaceae) pollens were identified in the *T. pagdeni* honey. Hence, this study revealed that mechanism in *T. pagdeni* maintaining their colonies during flowering and dearth seasons and also emphasized the importance of this species as great pollinators in the local plants. In addition, this study could be the diligently reference since it was carried out in Thailand where similar finding could be disclosed in other Southeast Asia country.