



Research project of counterparts funded at IPB

Name	Counterpart	Title
Rika Raffudin	A01	The Effect of land-use change on the foraging behavior and pollen diversity in honey of the Giant Bee <i>Apis dorsata</i> in Sumatra, Indonesia

Background

The giant honey bee *Apis dorsata* is the most efficient and common pollinator in Indonesian natural and agroforestry ecosystems. It is also important for honey production. The bees migrate annually, flying to the regions where plants are in bloom and nesting in certain trees, commonly *Gluta renghas*. However, much of the natural forests in Sumatra have been logged on a large scale and since then converted to monoculture plantations of acacia (*Acacia* sp.), oil palm (*Elaeis guineensis*), or *Eucalyptus*. It is unknown how *A. dorsata* is responding to these changes and it needs scientific investigation. We thus investigated: (1) the foraging behavior of *Apis dorsata* and, (2) the pollen content of the honey harvested from *A. dorsata* in landscapes dominated by plantations (Kampar, Riau) and forest (Kerinci, Jambi) in Sumatra.

Method

Two colonies of *A. dorsata* each in Kampar and Kerinci were observed at their nesting tree from a tree-house hide 20-30m above the ground. We measured the numbers of bees flying out of the nest, flying into the nest with and without pollen and the flight directions. Honey was harvested from all the colonies. The pollen in the *A. dorsata* honey was analyzed using a combination of acetolysis preparation and fuchsine stain (to account for pollen with delicate features). A total of 1200 pollen grains were counted and identified in each honey sample.

Results

The foraging activities of *A. dorsata* showed similar patterns in the different regions of Kampar and Kerinci. However, there were many fewer foraging bees at noon in Kampar than in Kerinci. Of the three directions of flight in Kampar, the southwest direction was the dominant one taken by the bees. The nesting tree of *A. dorsata* in Kampar was in remnant forest surrounded by an area of eucalyptus and oil palm plantations. Based on our observation, the southwest foraging direction taken by the bees was to the oil palm plantation. Analysis of the pollen content of the honey harvested from Kampar revealed that oil palm (*Elaeis guineensis*) pollen dominated (figure 1). This was in agreement with bee flight direction. Our study is the first description of way in which land use affects the ability of the giant honey bee to forage adaptively for pollen from the monoculture plantations surrounding their nest. In contrast, however, in Kerinci, there was no dominant pollen taxon. Those most abundant were from *Ilex* and the Asteraceae family. Pollen concentration and pollen diversity are much higher in Kerinci compared to Kampar (figure 1). The more diversified foraging behavior of *A. dorsata* in a more diverse heterogeneous landscape of forest and agriculture Kerinci (Jambi) landscape suggests adaptive behavior of this important pollinator bee.

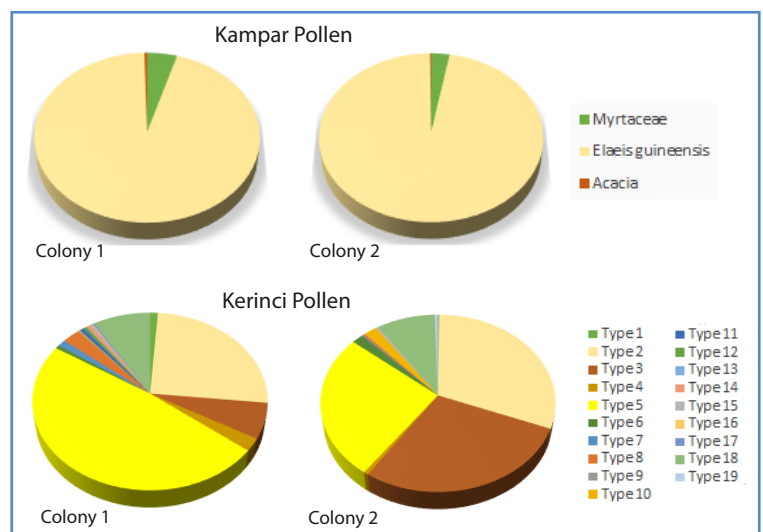


Figure 1. Bee pollen from honey in colony 1 & 2 in Kampar and Kerinci (Kerinci pollen identification still ongoing).