

## Research project of counterparts funded at IPB

Name	Counterpart	Title
Rika Raffiudin, Triatmowidi, Windra Priawandriputra	B09	Land use effects on foraging by the stingless bee Tetragonula laeviceps and on bee pollen diversity in a rainforest transformation landscape

## Background

Some animal species are able to adapt and maintain relationships in response to land use changes in their surroundings but others are vulnerable. The Indo malayan stingless bee *Tetragonula laeviceps* is usually found in forest areas and commonly exists in transformation landscapes such as rural and urban areas provided that there are sufficient nectar and pollen resources. The objectives of this research were: (1) to examine the effect of land use on the flight activities of T. laeviceps, namely, foraging time and flight directions in four landscapes: (a) secondary forest, and three land use change areas: (b) rubber plantation, (c) oil palm plantation, and (d) scrub; (2) to analyse the correlation between flight activity and environmental factors: humidity, light intensity and temperature and; (3) to investigate the diversity of pollen in the pollen baskets on the hind tibia of stingless bees from the four studied habitats.

The results indicated that bees kept in secondary forest collected the most pollen and resin. Pollen was collected in the morning and resin during the afternoon. Bees kept in rubber plantation collected the second most pollen, presumably taken from shrubs growing in the rubber plantation. Thus, the presence of flowering shrubs probably allows the bees to adapt to rubber plantations. In rubber plantations, two flight activities had the same pattern. These activities were leaving the nest and returning to the nest without pollen. There were a large number of bees in the morning and in the afternoon but small numbers at noon. Activity was positively correlated with temperature, humidity and light intensity. The oil palm plantation did not provide the pollen the bees need. This appears to be due to a lack of shrubs in the oil palm plantation and the fact that the oil palm itself was not flowering. To collect resin, bees kept in the oil palm plantation had to fly to another habitat, such as rubber plantation near the oil palm plantation. Bee flight activities were the lowest in scrub, thus scrub is the habitat to which the stingless bees are least adapted compared to the other two land uses. The high temperatures in scrub prevented the bees from foraging to distant places.



Figure 1. Tetragonula laeviceps (a) and nests in wooden boxes kept among oil palm trees (b)



Figure 2. Research team: left to right: Kevin Li, Rusnia Robo, Rika Raffiudin, Zumaida Pulungan

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Figure 3. Mean number of stingless bees in secondary forest, rubber, oil palm and scrub (a) leaving the nest, (b) returning to the nest with pollen. (c) returning to the nest without pollen, (d) returning to the nest with resin

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