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Ecology of ragadia makuta (lepidoptera: satyrinae) in tropical rainforests of Sabah, Malaysia.

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is confined in closed-canopy forest (Hill 1999). In addition, the food plants for this butterfly (*Selagenella* spp.) can be readily recorded from ground-based survey making it possible to quantify habitat requirements (Hill 1999).



Figure 1.3: *R.makuta* perching on *Selagenella* sp.

This thesis investigates the distribution and abundance of *R.makuta* in unlogged and logged forest selectively logged 10 to 11 years previously. Chapter two describes the study site and general materials and methods used to survey butterflies. Chapter three investigates habitat requirements of *R.makuta* and the effects of habitat modification on distribution and abundance of *R.makuta*. Chapter three also describes the methods used to measure and analyze vegetation structure at the study sites. Chapter four investigates seasonal effects of rainfall and sunshine on *R.makuta* abundance and chapter five discusses the use of *R.makuta* as a bioindicator for other forest butterflies.

analysis. Two people took readings at every station and the mean value was used in the analysis.



Figure 3.1: Densiometer used to measure canopy openness.

Abundance of *Selagenella* spp. was recorded at each station because this herb is the larval food-plant of *Ragadia makuta*. Abundance of *Selagenella* spp. was measured along 10 m transects running north, south, east and west from the centre of the station. Each transect was divided into 20 cm sections using a tape measure and the number of sections (200 per station) where a *Selagenella* plant touched the tape was recorded. The distance of each station to the nearest stream was also recorded because this is likely to determine the probability of *R.makuta* presence. Meteorological data (temperature, monthly rainfall and sunshine) were obtained from the meteorological station at the field centre.

Vegetation variables measured in this study are likely to be closely correlated and were analysed by principle component analysis (PCA). PCA is a data reduction technique used to reduce a large number of closely related variables to a smaller set of