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Diversity of bats at two contrasting elevations in a protected dipterocarp forest in Sarawak, Borneo

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ABSTRACT

We present an assessment of the diversity of Bornean bats at two contrasting elevations (119 m and 787 m) in Kubah National Park surveyed between August and December 2006. Three hundred and eighty-two individuals of bats from 26 species representing six families were recorded using 20 mist nets and three harp traps. The most commonly caught bat was *Hipposideros cervinus* (Gould, 1863) (n = 168) followed by *Penthetor lucasi* (Dobson, 1880) (n = 55), and they were also the most commonly detected species at low and high elevation sites, respectively. This survey yielded the first recorded specimen of *Pipistrellus cuprosus* Hill and Francis, 1984 for Sarawak. Analysis of daily cumulative capture rates indicated that further effort at these sites may not yield additional species if sampling techniques and locations are maintained. Species diversity index of Megachiroptera was higher at high elevations (*H'* = 0.567 versus H' = 0.466) whereas the species diversity index of Microchiroptera was greatest at low elevations (*H'*= 0.905 vs H' = 1.225).

KEYWORDS: Borneo, Chiroptera, bat diversity, elevation.

INTRODUCTION

Bats play a major role in ecosystem processes including pollination, seed dispersal and forest insect regulation (Davidson and Zubaid 1992; Tan *et al.* 1998; Payne *et al.* 2005). The importance of bats in these processes is particularly significant in tropical rainforest where chiropteran richness and diversity is high. Malaysia is renowned for these attributes of its bat fauna, however they vary with location and forest type. For example, Francis (1990) recorded 44 chiropteran species including nine species of fruit bats and 35 microbats in a primary lowland dipterocarp forest at Pasoh Forest Reserve, peninsular Malaysia, while Hall *et al.* (2002) recorded 23 species of bats (six Megachiroptera, 17 Microchiroptera) in a primary mixed dipterocarp forest (lowland mixed dipterocarp forest and tall mixed dipterocarp forest) at Niah National Park, Sarawak, Borneo. Despite tropical rainforests supporting high levels of bat diversity (Corbett and Hill 1992; Payne *et al.* 2005), studies on Bornean diversity are lacking (Struebig *et al.* 2006) although such basic information is important and plays a vital role for species conservation management, especially of rare and cryptic species (Frey 2006). Regional degeneration, fragmentation and deforestation pose a major threat to bats in South-east Asia (Lane *et al*. 2006). In light of this, we report the findings of our survey of Kubah National Park in Sarawak, Borneo.

METHODS

Study area. Kubah National Park (Fig. 1) is situated 20 km from Kuching city and covers an area of 2742 ha. This protected area consists of mixed dipterocarp forest, riverine forest, montane forest and heath forest. Several longhouses around this National Park have caused intrusion into, and excision of, forest produce. The terrain throughout this Park is steep with high ridges. The emergent tree species in the Park are forest species of the genera *Shorea*, *Dryobalanops* and *Dipterocarpus*. Other dominant tree species include *Calophyllum* sp., *Cotylelobium malayanum* v. Slooten and *Litsea resinosa* Blume. Details on the vegetation composition have been described by Hazebroek and Abang Morshidi (2000). Bennet and Walsh (1988) only recorded 18 terrestrial mammal species, suggesting this Park has relatively low large mammal diversity compared to other protected areas in Sarawak (Mohd-Azlan *et al.* in press). Sampling was concentrated at two elevations, 119 m and 787 m above sea level, for 14 non-consecutive days between August and December 2006. The lower elevation site consisted mostly of lowland dipterocarp forest with a mixture of primary and old secondary forest, while the higher elevation site was a mixture of primary hill dipterocarp forest and lower montane forest.

Sampling Methods. Each night, twenty mist nets and three two band-harp traps were set up at each elevation for