

ROOSTING BEHAVIOUR AND SITE MAPPING OF CAVE DWELLING BATS IN WIND CAVE NATURE RESERVE, BAU, SARAWAK, MALAYSIAN BORNEO

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ABSTRACT

A roost survey of cave-dwelling bats in Wind Cave Nature Reserve (Wind Cave NR) was conducted for 11 days from July 2013 until April 2014. This study aims to explore roosting ecology of bats in Wind Cave NR. From the total of 462 observations, five families of bats were recorded comprising 11 species of bats. These species include *Penthetor lucasi*, *Megaderma spasma*, *Myotis horsfieldii*, *Rhinolophus affinis*, *R. borneensis*, *Hipposideros ater*, *H. cervinus*, *H. coxi*, *H. diadema*, *H. galeritus* and *H. larvatus*. *Penthetor lucasi* was the most abundant species observed with colony size >100 individuals. Whereas the most roost observations was set by *M. horsfieldii* with 136 observations and the most diverse family was set by Hipposideridae with six species. Chi square analyses using contingency table showed statistically significant association existed between roost behaviour and the bats assemblages ($p < 0.05$). Another key finding in this study is the discovery of a colony of *H. coxi*, a Bornean endemic species that serve as the first ever record for this species inside a cave and for Wind Cave NR. Overall information presented herein able to assist the local management in developing strategy for conservation, long-term species monitoring and beneficial in ecotourism purposes.

Key words: Bat assemblages, cave-dwelling bats, roost behaviour, WCNR

INTRODUCTION

Chiropterans represent 44% of mammalian fauna in Malaysia (Corbet & Hill, 1992; Francis, 2008). At least a total of 98 species are known from Borneo (Phillips & Phillips, 2016). Of this a total of 44 species are cave-dependent species or species that use caves as their main roosting site (Payne *et al.*, 1985; Rahman *et al.*, 2011). Caves provide optimal physiological conditions that allow bats to enter torpor, hibernate and lower day-time energy consumption. This make cave as one of the major habitats for bats especially for some of the cave-dwelling bats in Borneo that are listed as endangered and protected species (Meredith & Woolridge, 1992). Therefore, protecting the cave is vital for bats conservation where cave-dwelling bats spend most time roosting (Kunz, 1982).

Bats are considered as key species in the ecosystem as it help to supply energy to the cave ecosystem through guano and its remains. Without the supply of energy, the energy flow will be interrupted and consequently affect the diversity of organisms inside the cave (Whitten *et al.*, 1999). Many cave habitats in Malaysia are currently being explored and threatened by human anthropogenic activities such as ecotourism, mining, guano and bird nests harvesting. Caves that being invaded by humans can no longer provide permanent cave bat roost because it faced structural changes (Lewis, 1995).

Studies on Wind Cave Nature Reserve (Wind Cave NR) bats diversity recorded 23 species of bats belonging to eight families. *Penthetor lucasi* was reported as the most abundant species in the nature reserve (Jub *et al.*, 2003; Mohd-Azlan *et al.*, 2005). In 2011, eighth species were reported as a new record within Wind Cave NR extant area

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