

Microclimate and Physiological Effects in the Roosts of Cave Dwelling Bats: Implications in the roost selection and the conservation in Sarawak, Malaysian Borneo

Praveena Rajasegaran¹, Nursyafiqah Shazali² and Faisal Ali Anwarali Khan^{1*}

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak.

Corresponding author: akfali@unimas.my

Running head: Cave Dwelling Bat Roost Preferences

Discipline: Ecology

Abstract: As a species, bats play a crucial part in both ecological and economic roles. However, this group of mammals is largely threatened due to anthropogenic activities either inside or around their caves. In this study, we investigate the effects of cave microclimate and physiological parameters on bat roost preference in Fairy Cave Nature Reserve (Fairy Cave NR). The microclimate and physiological parameters including temperature (°C), relative humidity (RH), light intensity (lux), air flow, passage dimension (m), roost height (m) and distance of roost from nearest entrance (m) were measured. Results showed that *Emballonura monticola*, *Hipposideros diadema*, *Hipposideros larvatus* and *Penthetor lucasi* were roosting in Fairy Cave NR. These bats can be distinguished by their colony size, roost posture, spatial arrangement and position of their roost. *Penthetor lucasi* makes up the largest colony in the bright zone, whereas *E. monticola* has the smallest colony occupying the twilight zone throughout the cave. Members from the family Hipposideridae roost in the dark portion of the cave with zero light intensity. *Emballonura monticola* utilizes the hottest roost in the cave compared to the other microbats, whereas *H. diadema* inhabits the coolest roost. Physiological parameters such as light intensity, passage dimension and distance from nearest entrance are significant parameters in roosting preferences. These parameters should be monitored to ensure the sustainability of not only the aforementioned species, but also other species that roost in nearby caves of Bau limestone. (Wind Cave Nature Reserve- recorded with 13 species).

Keywords: bats; cave; ecology; microclimate; physiological parameter; roosting preferences

[NOTE] This manuscript has been peer-reviewed and accepted for publication in Zoological Science. In the interests of broad access and rapid dissemination, we are making it available online ahead of publication. Please note that the manuscript has not been formatted or copyedited. Citations of this work should use the following format: [author(s), title, year, DOI]. Please cite the published version once it becomes available.