

Above-ground Space Utilization and Feeding Guild of Tropical Rainforest Birds in Sarawak, Borneo

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ABSTRACT Above-ground space within tropical rainforests harbour many bird species. However, the mechanism for their coexistence remains largely unknown. Avian feeding guilds are known to be good indicator of habitat specialization, but the details of how bird use of above-ground space, especially in reference to feeding remain unclear. Double-stacked mist-nets, with a total of six shelves and extending up to 3.6 metres above ground, were deployed at 30 forest sites in the Baram, Baleh and Pelagus regions of Sarawak, Borneo (East Malaysia). A total of 2,613 birds, comprising 124 species, were captured. Eight feeding guilds were identified, with insectivores being the most abundant. Most birds were captured at shelf 3 and 4, equivalent to 1.2 to 2.4 metres above-ground. Both the number of species and individuals captured in the shelves increased from the ground upwards to reach a maximum at shelf 3, after which it decreased. Insectivores were the most common guilds at the lowest two shelves, accounting for 68 % in shelf 1 and 47 % in shelf 2. This study shows that tropical forest birds are able to coexist in the relative safety of the above-ground space by exploiting different food resources indicating the importance of feeding guild in determining vertical stratification of avifauna species.

KEYWORDS: Tropical birds, vertical stratification, mist nets, feeding guild, insectivores, Sarawak

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INTRODUCTION

The bird community in Borneo is made up of 674 species (Lepage, 2017), comprising both resident and migratory taxa. The habitats for birds in Borneo range from mangrove forests along the coastal areas, to the montane forests above 1000 m ASL (Phillipps & Phillipps, 2014). The variety of bird community inhabiting the different forest types is a consequence of the different resources supplied by each habitat. Habitat-specialised species, such as egrets and herons, occur in areas adjacent to waterbodies, while montane species, such as the Mountain Black-eye, occurs on highlands above 1000 m ASL. Comparatively, lowland forested areas would contain higher concentration of bird in the tropic due to the sufficiency and variety of food resources (Rahman & Tuen, 2006; Mansor *et al.*, 2011; Nurul Ashikeen *et al.*, 2015).

Assemblages of birds in relation to their feeding guild have been widely studied. Previous findings reported that habitats dominated by insectivores varies and range from secondary forests, oil palm plantations, subtropical land-bridges islands to coastal areas (del Rio, 2001; Azman *et al.*, 2011; Pineda-Diez *et al.*, 2012; Ding *et al.*, 2015; Rathod *et al.*, 2015). Other studies reported that insectivores and frugivores were negatively affected by logging but nectarivores and granivores were positively affected (Burivalova *et al.*, 2015). Granivores associate more with anthropogenic activities, as seen from their occurrences at paddy field (Azman *et al.*, 2011; Azman *et al.*, 2012).

In the studies of vertical stratification of avifauna species and their feeding guilds, above-ground space is typically defined as the vegetated area from the ground up to about 2 meters. Above