

TAXONOMY & ECOLOGY

Beyond Classical Approaches

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QUANTIFYING TAXONOMIC DIVERSITY OF SMALL MAMMALS IN KUBAH NATIONAL PARK

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ABSTRACT

A study on non-volant small mammals in the forest of Kubah National Park was conducted from 4th February 2009 until 29th May 2009. Mark-recapture technique with trapping grid design was applied for this study. The diversity of small mammals was assessed using two measures of taxonomic diversity, namely, average taxonomic distinctness (Δ^+) and variation in taxonomic distinctness (Δ^+). A total of 106 individuals representing 12 species and four families were recorded in 10,000 trapping effort. The most dominant family was Muridae and the most species captured was *Maxomys rajah*. Taxonomic diversity (Δ^+) and evenness (Δ^+) for small mammals in the study area were 73.220 and 958.095, respectively. Evenness in taxonomic spread was high for present study and low for previous studies compared to the master list. The study found low evenness, as indicated by Δ^+ in the forest, was attributed to the presence of a group of taxonomically closely related small mammals more adapted to prevail in the complex structure of habitat. Simulated average taxonomic distinctness values compared to expected value of master list revealed that none of present or previous sample data has genuine loss of taxonomic diversity of small mammals. The result may assist the management and monitoring of the habitat that provide food and shelter to the small mammals.

Keywords: Non-volant small mammal, Kubah National Park, taxonomic distinctness

INTRODUCTION

Small mammals can be defined as any mammal that has live weight less than five kilogram as an adult (Hayward and Phillipson, 1979). Small mammals are widely studied in both Peninsular Malaysia and Borneo regions; most of the studies primarily focused on diversity and abundance (Saiful *et al.*, 2004), others emphasized on home range sizes (Tamura, 1993; Saiful *et al.*, 2001a), vertical stratification (Lim *et al.*, 1977; Saiful *et al.*, 2001b), social behaviour (Tamura & Yong, 1993), and impact of human disturbance on habitat (Johns, 1987). However, most studies on diversity of small mammals in Malaysia were assessed based on conventional diversity measures only (Stuebing and Gasis, 1989; Saiful and Nordin, 2004; Bernard *et al.*, 2009). Apart from that, there is a new diversity measure, developed and proposed by Warwick and Clarke (1995), namely taxonomic diversity or taxonomic relatedness-based diversity. Taxonomic diversity can be a useful tool as ecological indicator for biological assessment, and for environmental monitoring and management (Ellingsen *et al.*, 2005; Leonard *et al.*, 2006).

Taxonomic diversity is a measure of diversity that has great advantage of being independent on sampling size or effort. Hence, it can be used to compare data sets collected using different methods from different sampling events, unlike species diversity measures. Moreover, it can be used as a complementary measure for conventional diversity measures such as Shannon Index, Simpson's Index and Alpha diversity index. In addition, conventional diversity which is mostly based on the number of species and their relative abundance demonstrate only one facet of biodiversity (Warwick and Clarke, 1998). Therefore, several studies on biodiversity assessment have stressed the need to take account of the relatedness of species composing assemblages (Faith, 1992; Purvis and Hector, 2000). Clarke and Warwick (2001) had mentioned that an assemblage comprising a group of closely related species, can be regarded as less diverse compared to an assemblage with the same number of more distantly related species. In other word, the most taxonomically varied will be the more diverse (Clarke and Warwick, 2001). Taxonomic diversity can be tested for the departures from expectation