

MITOCHONDRIAL DNA DIVERSITY OF THE LONG-TAILED MACAQUE (*Macaca fascicularis*) FROM THE NORTHERN REGION OF PENINSULAR MALAYSIA

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ABSTRACT

We examined the genetic diversity of 64 long-tailed macaques from the northern states of Peninsular Malaysia covering the states of Perlis and Kedah including the Langkawi Island using the complete control region (CR) segment of the mitochondrial DNA. Standard genetic diversity including nucleotide diversity, haplotype diversity and genetic divergence were calculated. Moderate nucleotide diversity ($\pi = 0.021$) was observed which is higher than a previous study on the Penang *M. fascicularis* population. Twenty-three haplotypes were detected with haplotype diversity, h of 0.936. Haplotype sharing was observed among Langkawi and Perlis macaques indicating historical connection between the island and the mainland. Phylogenetic trees constructed grouped the samples into 4 groups without any obvious populations structuring.

Keywords: Control region, Genetic diversity, Long-tailed macaque, mtDNA, Northern Peninsular Malaysia, Phylogenetic relationships

INTRODUCTION

The long-tailed macaque, *Macaca fascicularis*, also known as the crab-eating or cynomolgus macaques are the second most studied non-human primates after the rhesus macaque, *M. mulatta*. Distributed across vast areas of the mainland and insular Southeast Asia (Fooden, 1995), this species is very common and lives sympatrically with the other primate species including human. Commonly used as primate model in biomedical research, *M. fascicularis* are the prime candidate for the study of human diseases (Villano *et al.*, 2009, Shiina *et al.*, 2010).

In 2007, a Non Detrimental Findings (NDF) study was conducted by the Department of Wildlife and National Parks (DWNP) to estimate the *M. fascicularis* population in Peninsular Malaysia, indicating approximately 740,000 individuals (DWNP, unpublished report). The ban imposed by the Malaysian government on primate exportation and hunting in 1985 (DWNP, 1985) led to the population increase and since then had caused conflicts with human and considered as pest (DWNP, 2006). A recent field census conducted by the DWNP in 2011 revealed a total of 127,050 conflict macaques (DWNP, unpublished report).