

Leptospiral agglutinins in captive and free ranging non-human primates in Sarawak, Malaysia

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Abstract

Aim: The proposed study was carried out to determine the extent of exposure to leptospirosis in non-human primates.

Materials and Methods: Trapping of non-human primates was carried out opportunistically around the Bako National Park and the Matang Wildlife Center in the vicinity of human settlements and tourism areas of Sarawak. Blood samples were obtained from the saphenous vein to determine the presence of antibodies by the Microscopic Agglutination Test (MAT) to 17 serovars of *Leptospira* commonly found in Malaysia.

Results: This study reports the screening of twelve primates (eight captive and four free ranging) for leptospirosis. Eight of the 12 monkeys (66.6%; 95% CI 34.9-90.1) reacted against one or two serovars of *Leptospira* (Lai and *Leptospira* Lepto175). The serovar Lai is considered pathogenic for different mammals, including humans. *Leptospira* Lepto 175 has been identified as an intermediate strain and further studies are being undertaken on this serovar.

Conclusion: These results are important as primates may act as reservoirs of *Leptospira* spp. for humans, which may potentially affect tourism (economic loss), conservation efforts and public health.

Keywords: leptospirosis, MAT, non-human primates, seroprevalence, wildlife, zoonotic disease.

Introduction

Leptospira have been detected from wildlife in many countries, however their role as reservoirs is still poorly understood [1-3]. Leptospirosis can result in economic losses in domesticated animals and has the potential to be an important zoonotic disease of humans [4]. Leptospire were first isolated from rats in 1917 and it is widely acknowledged that rodents are a key source of infection for humans [5]. However, recently Australian and Peruvian researchers have reported that bats can also carry pathogenic *Leptospira*, [1-2, 6], although their role as carriers is not fully understood. Other wildlife, including primates, can also act as potential carriers of these pathogens [7-10]. However to date there has been little research conducted on free ranging wildlife. Leptospirosis in wildlife can affect biodiversity, human and livestock health, animal welfare and consequently the national economy [4].

Recently leptospirosis has been recognised as a re-emerging public health problem in Malaysia [11]. At present Malaysian wildlife disease surveillance is poorly coordinated and emerging zoonotic infectious diseases represent a growing threat. Tourism is a major contributor to the economy of Malaysia with 24.6 million tourists visiting the country annually. It has been estimated that approximately one million tourists

are involved in eco-tourism activities and this group is particularly at increased risk of exposure to infectious diseases [12-13].

In recent years outbreaks of leptospirosis in Malaysia have been documented around the wildlife reserves and parks resulting in confirmation of a high number of confirmed cases and associated mortalities. Wildlife tourism is an important source of revenue in Malaysia, particularly in the state of Sarawak and leptospirosis has the potential to impact on this. The current research reports on the carriage of *Leptospira* by opportunistically sampled non-human primates in Sarawak.

Materials and Methods

Ethical approval: All procedures were performed with the approval of the Animal Ethics Committee of the Murdoch University (W2376/10) and Sarawak Forestry cooperation (NCCD.907.4.4 (V)-235).

Study area: Trapping of monkeys was carried out around Bako National Park and Matang Wildlife Centre. Bako National Park is located 37 km from Kuching, Sarawak, East Malaysia (Figure-1). It is Sarawak's oldest national park, covering an area of 2,727 hectares and is located at the tip of the Muara Tebas Peninsula [14]. Although it is one of the smallest national parks in Sarawak, it contains almost most types of vegetation found in Borneo along with long-tailed macaques (*Macaca fascicularis*), silver-leaf monkeys (*Trachypithecus cristatus*), proboscis monkey (*Nasalis*

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