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VERTICAL INFESTATION OF THE DENGUE VECTORS *Aedes aegypti* AND *Aedes albopictus* IN APARTMENTS IN KUALA LUMPUR, MALAYSIA

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ABSTRACT. Dengue is a serious public health problem in Malaysia. The aim of this study was to compare the vertical infestation of *Aedes* population in 2 apartments in Kuala Lumpur with different status of dengue incidence (i.e., high-dengue-incidence area and area with no reported dengue cases). The study was also conducted to assess the relationship between environmental factors such as rainfall, temperature, and humidity and *Aedes* population that may influence *Aedes* infestation. Surveillance with a mosquito larvae trapping device was conducted for 28 continuous weeks (January to July 2012) in Vista Angkasa (VA) and Inderaloka (IL) apartments located in Kuala Lumpur, Malaysia. The results indicated that both *Aedes* spp. could be found from ground to higher floor levels of the apartments, with *Aedes aegypti* being more predominant than *Ae. albopictus*. Data based on mixed and single breeding of *Aedes* spp. on different floors did not show any significant difference. Both rainfall (R_3 ; i.e., the amount of rainfall collected during the previous 3 wk before the surveillance period began) and RH data showed significant relationship with the number of *Aedes* larvae collected in VA and IL. No significant difference was found between the numbers of *Aedes* larvae in both study areas as well as maximum and minimum temperatures. Results also indicated adaptations of *Ae. aegypti* to the ecosystem at each elevation of high-rise buildings, with *Ae. albopictus* staying inside of apartment units.

KEY WORDS *Aedes aegypti*, *Aedes albopictus*, Vista Angkasa, Inderaloka, dengue

INTRODUCTION

Dengue is one of the most important vector-borne viral diseases in urban and suburban areas of tropical and subtropical regions throughout the world (Gibbson and Vaughan 2002). Pathologically, dengue is a flavivirus infection that may be caused by 4 distinct serotypes of viruses, which include DENV-1, DENV-2, DENV-3, and DENV-4 (Gubler 1998). These pathogens are transmitted by *Aedes aegypti* (L.) and *Aedes albopictus* (Skuse) (Rudnick et al. 1965). The clinical manifestation and symptoms of the infected individual include severe fever along with intense headache, loss of appetite, as well as serious pain in various parts of the body, and in some cases require hospitalization (Vazquez-Prokopec et al. 2010).

Worldwide, approximately 50 million cases of dengue fever and dengue hemorrhagic fever have been reported with >20,000 deaths annually, particularly in the endemic regions (Gibbson and Vaughan 2002). In Malaysia, the 1st dengue fever and dengue hemorrhagic fever cases were recorded in 1902, followed by the 2nd case in 1962 in Penang (Rudnick et al. 1965). According to available records, the 1st major dengue outbreak was reported in 1970 (Rudnick et al. 1965). In

2009, there were up to 33,684 infected dengue patients reported and the figure continues to swell to 40,152 in 2010 with 118 deaths (MOH 2010). Subsequently, an increase of almost 13% over the previous year was seen in 2011, with a total of 46,171 dengue cases and 134 deaths (Maimusa et al. 2012). The recent 2012 figure indicated that the overall dengue cases in Malaysia for the 1st half of the year (January to May 2012) were 9,607 with 20 deaths as compared to the same period in 2011, when a total of 7,963 dengue cases with 12 deaths were reported (Ministry of Health Malaysia, unpublished data). Indeed, statistics are rising at an alarming rate.

Currently, there is no commercialized vaccine available for dengue. Thus, the implementation of efficient vector control surveillance is essentially paramount to prevent and reduce the number of dengue outbreaks especially in both endemic and epidemic areas (PAHO 1994). The partnership and involvement from both public health sectors and nongovernmental organizations are very much needed to initiate preventive measures particularly when the abundance of *Aedes* mosquitoes is assumed to be high enough to facilitate dengue outbreaks especially in dengue hotspot areas (PAHO 1994). Many techniques have been performed for monitoring the dispersal and abundance of dengue vectors. Several entomological indices have been developed and employed to assess the infestation of immature *Aedes* mosquito, particularly larval and pupal stages, including the Breteau Index, House Index, Container Index, pupal or demographic surveys,

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