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Assessing dengue outbreak areas using vector surveillance in north east district, Penang Island, Malaysia

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ABSTRACT

Objective: To understand the efficacy of ovitrap surveillance and its implementation on monitoring reflection upon case occurrence in relation to climate variables.**Methods:** We used routinely setup ovitrap surveillance to monitor the mosquito populations in previous outbreak areas. Ovitrap were installed weekly at three localities that experienced high number of dengue cases (Flat Hamna, Kampung Sungai Gelugor and Kampung Tanjung Tokong) from January 2010 to February 2011. Ovitrap and paddles were brought back to the laboratory and all of the water contents were poured into an enamel pan. Aged tap water was added into the enamel pan and eggs were allowed to hatch. The hatching larvae were counted after 3 days. The hatched larvae were identified at the 3rd instar larval stage. The ovitrap indices and mean number of larvae were analyzed using student *t*-test and One-way ANOVA. Spearman's rank correlation coefficient was used to determine the relation between meteorology variables and dengue fever cases.**Results:** *Aedes albopictus* was found as dominant species followed by *Aedes aegypti* recorded in all three study areas. *Aedes aegypti* preferred to breed outdoor with larvae collection, which was higher than indoor (72.37%). There was a positive correlation between the ovitrap index with the rainfall and humidity except in Kampung Tanjung Tokong. Our result also showed negative correlation between temperature and ovitrap index in all localities.**Conclusions:** This study provides useful data to be adapted in dengue vector management. It is very important to understand the fluctuation of vector population according to the seasonal activity, which can help us to improve our control programs. However, other factors might also contribute to the increment of dengue outbreak such as the number of available breeding sites, behavior of the vector against environmental factors and the cleanliness of the environment.

1. Introduction

The first dengue fever (DF) case in the Peninsular Malaysia was reported in 1902 and the first dengue hemorrhagic fever was reported in 1962 in Penang. Between 1962 and 1964, there were 61 cases with five fatalities, which were confirmed by dengue virus isolation and serology[1]. The cases increased with 67 reported

cases in 1965[2]. From November 1962 to July 1963, 41 dengue haemorrhagic fever patients were admitted at General Hospital, Penang[3]. Recently, in 2014, 108698 dengue cases were notified with 215 deaths with an increment of the 151% cases compared to 43346 cases reported in 2013 in Malaysia. The increasing number of cases was contributed by the peoples' movement, changes in dengue serotype from dengue virus type 2 to dengue virus type 1, climatic factors and lacking in human awareness about dengue[4].

In Asia, *Aedes albopictus* (*Ae. albopictus*) plays a role as an urban vector to spread the dengue viruses[5]. Generally, *Aedes aegypti* (*Ae. aegypti*) distribution is always correlated with the dengue outbreak following rainy season and the spike in *Ae. albopictus* mosquito population matched with the dengue occurrence[6,7]. *Ae. albopictus*

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