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Contribution of public places in proliferation of dengue vectors in Penang Island, Malaysia

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ABSTRACT

Objective: To determine abundance, distribution and diversity of potential breeding container habitats of the dengue vectors in public places including schools, restaurants, mosques and parks in southwest areas of Penang Island, Malaysia.**Methods:** Premises at restaurants, schools, parks and mosques were surveyed simultaneously and inspected visually for container habitats and production of immature mosquitoes from March 2015 to March 2016. Abundance (mean \pm SE) of breeding containers between sites was compared using One-way ANOVA. Independent sample *t*-test was used to compare total number of *Aedes albopictus* (*Ae. albopictus*) and *Aedes aegypti* (*Ae. aegypti*) surveyed.**Results:** The surveyed locations yielded a total of 3741 breeding containers and 19537 immature mosquitoes from four areas. Concurrent artificial and natural containers produced 78.4% immature *Ae. albopictus* and 6.3% *Ae. aegypti* mosquitoes in wet season, with 14.2% *Ae. albopictus* and 1.1% *Ae. aegypti* mosquitoes in dry season. Artificial containers accounted for 98.1% of the total containers recorded, with restaurants being the most productive locations (8012) and schools being the least productive (2234).**Conclusions:** It was concluded that public places are good sources of potential container habitats of *Aedes* mosquitoes in Penang Island, Malaysia and *Ae. albopictus* has exclusively replaced the home-grown *Ae. aegypti* even in urban areas. Therefore, treatment of artificial containers in such locations is critical in *Aedes* mosquito control campaigns during dengue outbreaks.

1. Introduction

Dynamism in breeding containers of residential areas is comparably less and numerous studies have been conducted in residential areas, neglecting special units like school, restaurants, mosques and parks despite their potentials in providing good shelter for dengue vectors. Containers that produce excessive

numbers of *Aedes aegypti* (*Ae. aegypti*) are termed key containers [1,2]. Traditionally, campaigns for dengue control target artificial water holding containers, e.g., discarded tires, plant pot bases, rainwater tanks and domestic rubbish as well as natural containers [3], and subterranean sites, e.g., wells, mine shafts and service pits [4]. During construction activities in urban areas in Penang, contrasting habitats have been found related to abundance of immature *Aedes* [5]. Eighty percent (24/30) area of the southwest district of Penang Island has been recognized as dengue hotspot. Natural containers or outdoor man-made habitats with great amount of organic debris are more likely prepared by *Aedes albopictus* (*Ae. albopictus*) [6]. *Ae. albopictus* has been found typically inhabiting natural and artificial containers [7].

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