

UNIVERSITI TEKNOLOGI MARA

**PROFILE DISTRIBUTION OF
JUVENILES *Aedes* SPECIES WITH
REFERENCES TO ITS
PHYSICOCHEMICAL
CHARACTERISTICS OF THE
BREEDING HABITAT IN URBAN
AREAS**

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ABSTRACT

Dengue fever is an urban vector-borne disease transmitted by *Aedes aegypti* and *Aedes albopictus*. Both species lay their eggs in favourable breeding containers either in natural or artificial containers. *Aedes* surveillance through search and destroy was carried out randomly at 16 localities in central zone of Shah Alam, Malaysia. A minimum of 100 houses were inspected the peridomestic area for *Aedes* species. The *Aedes* indices are calculated for each locality and the types of containers found are being categories accordingly. *In-situ* measurement of selected physical parameters, observation of environmental characteristics and the presence of vegetation are conducted. Mosquito larvae and pupae that were found in different types of containers were brought to the laboratory for identification. Water analysis were conducted to determine water breeding characteristic while larval species identification was conducted to identify the dominant species in Shah Alam. A total of 62 containers with positive breeding were discovered during the survey. *Ae. albopictus* easily found throughout the localities while plastic container become the most preferences breeding container and paint cans were the favourable breeding container. Seksyen 1 and Seksyen 14 show the highest percentage of BI with 70% and 80% respectively. Based on profile distribution of *Aedes* habitat, rubber materials were the most efficient for pupae development (Ce: 2.10). As for breeding preference; clear water container with the presence of dead vegetation was the most preferable which were 70.97% and 32.26%, respectively. In term of water volume, most of the species preferred low water volume (59.38%). Consequently, statistical test showed that volume of water, wind velocity and distance from human habitation was statistically significant towards different types of dengue vectors containers. Calcium is considered as the water parameter that attract female *Aedes* mosquito to lay their eggs and also enhanced the development of *Aedes* larvae between different dengue risk area (DSA and NDSA) with *p-value* of 0.033. Essentially, the findings has provided the profile of dengue vectors breeding habitat based on its environmental and water conditions in central zone of Shah Alam. These outcomes provide useful information on *Aedes* species by container characteristics so as to enable selective elimination of dengue vectors habitat in order to minimize future dengue outbreak.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Dengue virus can be transmitted to humans by infected females of *Aedes aegypti* (Linnaeus, 1760) and *Aedes albopictus* (Skuse, 1884) (Dom *et al.*, 2016a). Both of the species commonly trigger the incidence of dengue fever globally. In general, mosquitoes live in various habitats such as in fresh water, brackish water or any water that is clear, turbid or even polluted with the exception of high-salt concentration area (Saleeza *et al.*, 2011). *Aedes aegypti* can be regularly found indoors while *Aedes albopictus* are commonly found outdoors in open spaces with shaded vegetation and suitable breeding habitat such as in garbage dump, under trees or bushes and in car tires. This enables *Aedes* mosquitoes to lay eggs in both natural habitats such as tree holes and plants as well as in artificial containers (Juan, 2014; Ngugi *et al.*, 2017).

Mosquitoes in urban landscape commonly utilize water-holding containers, for instances tires, buckets, fence pots and discarded containers where they develop through the immature developmental stages of eggs, larvae and pupae. *Aedes* mosquitoes prefer to oviposit in shaded containers where the temperatures are usually lower than in direct sunlight (Crepeau *et al.*, 2013), but a range of other cues may also affect female oviposition preferences. Larval mosquitoes develop through four instar stages, consuming detritus and associated microbes to obtain nutrients (Bara *et al.*, 2014). Once the larvae reach the fourth instar, they pupate and eventually emerge into flying adults. Because immature mosquitoes are restricted to discrete and often easily identifiable aquatic habitat, they are usually easier to target for control activities than adult mosquitoes (George *et al.*, 2015). Mosquito abundance has been shown to vary within residential areas with increased container infestation associated with improper solid waste management in residential areas (Mudin, 2015; Banerjee *et al.*, 2015). Different housing types have been linked to varying rates of mosquito abundance, species composition and diseases transmission (Rozilawati *et al.*, 2015; Dhar-Chowdhury *et al.*, 2016).