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A Survey of Container Breeding Mosquitoes (Diptera: Culicidae) at Residential Areas in Kuching and Samarahan Divisions, Sarawak.

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ABSTRACT

An investigation of mosquito larvae breeding in containers was conducted at residential areas in Kuching and Samarahan Divisions in Sarawak during the dry season from June to August 2018. Sampling was carried out by dipping with a pipette and dipper depending on the container types. Seven breeding containers, namely plastic container, plastic pail, bottle, coconut shell, tin can, aluminium bowl and plastic bowl were sampled within the residential areas. Ambient temperature and relative humidity of the breeding sites were recorded during each visit. A total of ten species comprising 7,356 mosquito larvae were collected. *Aedes albopictus* was the most common with 2,712 individuals collected in the Kuching Division. In Samarahan Division, a total of seven species comprising of 5,801 mosquito larvae were collected and *Culex quinquefasciatus* had the highest number with 2,689 individuals. Among all the containers, coconut shells were the preferred container for breeding and most commonly use by the mosquitoes. To control the number of mosquitoes, it is necessary to eliminate artificial and natural containers or breeding habitats in and around residential areas. *Aedes aegypti* larvae were not found in the present survey.

Keywords: mosquitoes, containers, *Aedes albopictus*, *Culex quinquefasciatus*, Sarawak

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JABATAN MUSEUM SARAWAK

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Keywords: mosquitoes, containers, *Aedes albopictus*, *Culex quinquefasciatus*, Sarawak

INTRODUCTION

Mosquito are vectors and they undergo complete metamorphosis stages in the life cycle of egg, larva, pupa and adult. Mosquitoes of the genera *Aedes*, *Culex* and *Anopheles* are well-known as pathogen carriers and transmit diseases like dengue, yellow fever, Japanese encephalitis, filariasis and malaria (Snow, 1990).

Mosquito related diseases have impacts on millions of people every year. Mosquito-borne diseases are the major public health problems in Malaysia. In Malaysia, a study was conducted to determine the breeding habits of the genus *Aedes* and *Anopheles* to prevent and control the outbreak of

dengue and malaria cases (Rahman *et al.*, 1997; Rohani *et al.*, 2011). A survey of ecological sites of the genus *Anopheles* and vector of malaria parasites was carried out in the Kapit Division of Sarawak (Tan *et al.*, 2008). In 1983, dengue cases were reported in 54 localities involving the villages adjacent to Lawas town in Lawas District (Chang and Jute, 1986). Proper controls of mosquitoes breeding sites are important in preventing the outbreak of mosquito related diseases.

Generally, mosquitoes breed in various habitats and prefer all sorts of stagnant water. Containers, either artificial or natural, are the most important factors which determine larval survival in and around human habitations. The most common natural containers for mosquitoes breeding habitats are empty coconut shells, bamboo stumps and crustacean shells. A survey conducted in Peradeniya, Sri Lanka showed that three predominant mosquito species namely *Aedes albopictus*, *Aedes novalbopictus* and *Armigeres subalbatus* breed in open bamboo traps (Amerasinghe and Alagoda, 1984). Another study by using mature coconut shell as ovitraps recorded seven mosquito species in Asajaya Sarawak, Malaysia (Wong *et al.*, 2012).

Mosquito larvae could also be collected in common artificial containers, such as plastic cups, bottles, plant vases, tin cans and used tires which provided breeding sites for mosquitoes. A study showed cement cistern and mud pot were mainly breeding sites for *Aedes aegypti* and *Aedes vittatus* in India (Rajesh *et al.*, 2013). Another survey conducted in India showed that *Ae. aegypti* was the predominant container breeding mosquito (Thete and Shinde, 2013).

In Malaysia, research was conducted to show the preferred breeding sites of mosquito species. A study showed plastic containers as the highest *Aedes* mosquito breeding sites in urban and suburban areas in Malaysia (Rohani *et al.*, 2014). In Perak, plastic containers were identified as breeding sites of *Aedes albopictus* and *Aedes aegypti* (Mahfodz *et al.*, 2017). A study conducted in Kuala Lumpur showed *Ae. albopictus* was found mainly in plastic containers compared to polystyrene, vase, cement floor and other breeding containers (Mahmud *et al.*, 2018).

The present study was conducted to identify the diversity of mosquito species in artificial and natural breeding containers at residential areas in Kuching and Samarahan Divisions. An initial survey was conducted to identify the densities of mosquito species present in containers at both locations. The study was conducted to categorise the occurrence and abundance of mosquito species in artificial and natural containers. Such information can be used as a baseline for an effective programme to control mosquitoes in residential areas.

MATERIALS AND METHODS

The present study was conducted to record the occurrence of mosquito species as well as their preferred breeding habitat. The container survey was sampled from June to August 2018 in the Kampung Tringus Bau, Kuching and Kampung Tabuan, Samarahan Divisions (Figure 1). Sampled areas are located mainly in the house backyards, garden or farm areas. Agriculture such as fruit plantation and farming are the main activities in both villages. The local peoples plant different types of fruit trees