

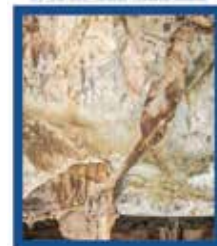


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ABUNDANCE OF *Aedes Albopictus* AND *Culex Quinquefasciatus* LARVAE (DIPTERA: CULICIDAE) IN KAMPUNG TRINGGUS, KUCHING DIVISION, SARAWAK

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ABSTRACT

Mosquito-borne diseases are a significant public health concern in tropical regions, including Sarawak, Malaysia. This study investigated the occurrence of *Aedes albopictus* and *Culex quinquefasciatus* mosquito larvae in breeding containers in a village of Bau, Sarawak. Ovitrap surveillance was conducted by collecting mosquito larvae from a total of 252 natural and artificial containers over a period of six months, from September 2018 to February 2019. The collected larvae were reared to adults and identified using morphological characteristics of the species. Ten mosquito species belonging to five genera were documented in the present study. A total of 5,825 individuals were encountered within the village. The study revealed a high incidence of both *Ae. albopictus* totalling 2,708 individuals, and *Cx. quinquefasciatus*, comprising 721 individuals, in larval stages present in the breeding containers found within the village of Bau. The mosquito species with the lowest number was *Tripteroides* sp. with only three individuals collected over the six-month study. An understanding of the distribution and abundance of mosquito species in village is crucial to raise awareness and implement effective vector control measures.

Keywords: *Aedes albopictus*, *Culex quinquefasciatus*, breeding containers, village, Sarawak



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INTRODUCTION

Mosquito-borne diseases are a major global public health challenge, particularly prevalent in tropical and subtropical regions (Dahmana and Mediannikov, 2020). Favourable environmental conditions facilitate mosquito proliferation and the transmission of associated diseases (Ahmed *et al.*, 2019). Species belonging to the genera *Aedes* and *Culex* act as prominent vectors for a diverse array of pathogens, presenting substantial obstacles to disease control initiatives (Nebbak *et al.*, 2022). Notably, *Ae. albopictus* and *Cx. quinquefasciatus* are recognized as significant mosquito species capable of transmitting a range of viral and parasitic diseases to humans (Hernandez-Triana *et al.*, 2022; Lopez-Solis *et al.*, 2023). These vectors contribute to the spread of diseases such as dengue, chikungunya, Zika, and lymphatic filariasis, highlighting the importance of effective mosquito control measures to mitigate the burden of mosquito-borne diseases on public health.

Breeding containers commonly encountered in residential environments are recognized as primary habitats conducive to mosquito larvae development (Respati and Feriandi, 2020). Numerous research studies on mosquito breeding have been conducted internationally and within Malaysia. For instance, in India, the highest larval abundance of *Ae. albopictus* and *Cx. quinquefasciatus* were recorded from the plastic containers (Thee and Shinde, 2013). Athallah *et al.* (2020) conducted a survey in Indonesia, identifying cement and plastic containers as the dominant breeding habitats for *Aedes* larvae. In Africa, plastic barrels were found to be the predominant mosquito breeding habitat in urban areas, while metal tankers were the primary breeding sites in semi-urban areas for *Aedes* and *Culex* species (Weldu *et al.*, 2024).

In Malaysia, coconut shells have been identified as preferred breeding habitats for *Ae. albopictus* discovered in paddy growing areas in Kuala Pilah, Negeri Sembilan, Malaysia (Wan-Norafikah *et al.*, 2018). Saleeza *et al.* (2013) conducted a study in Putrajaya, where *Ae. albopictus* was observed as the dominant species in the flower pots, flower pot plates and watering cans. In Klang, Selangor, Malaysia *Aedes* species were also the most abundant species collected from various sources such as flower pot plates, buckets and tires (Zaki *et al.*, 2023). An understanding on the species diversity of *Aedes* and *Culex* mosquitoes in breeding containers is crucial for devising targeted vector control measures and implementing efficacious disease prevention strategies within residential areas.

Seasonal variations in weather conditions significantly influence mosquito breeding, particularly as female mosquitoes seek for oviposition sites (Rozilawati *et al.*, 2007). Temperature and humidity are significant factors influencing the development

and breeding of mosquito larvae (Sauer *et al.*, 2021). In Malaysia, a strong correlation has been observed between the total numbers of mosquito larvae collected and high temperatures (31.50°C) with low humidity (69.00%) (Dom *et al.*, 2013). Similarly, in Cyprus, warm temperatures accompanied by a humidity level of 72% have led to a notable increase in mosquito populations (Drakou *et al.*, 2020).

In this study, our objective was to identify the relative abundance and distribution of *Aedes* and *Culex* mosquito species within breeding containers in the study site. We further discussed the implications of our findings on the field of medical entomology and underscored the significance of community engagement in the sustainable mosquito management practices.

MATERIALS AND METHODS

The study was conducted following approvals obtained from the relevant authorities prior to commencing the study. Informed consent was obtained from residents to access their premises and collect mosquito larvae from breeding containers within their vicinities. Field work was conducted in village of Kampung Tringgus, Bau, Sarawak, Malaysia, and the study spanned from September 2018 to February 2019 (Figure 1).

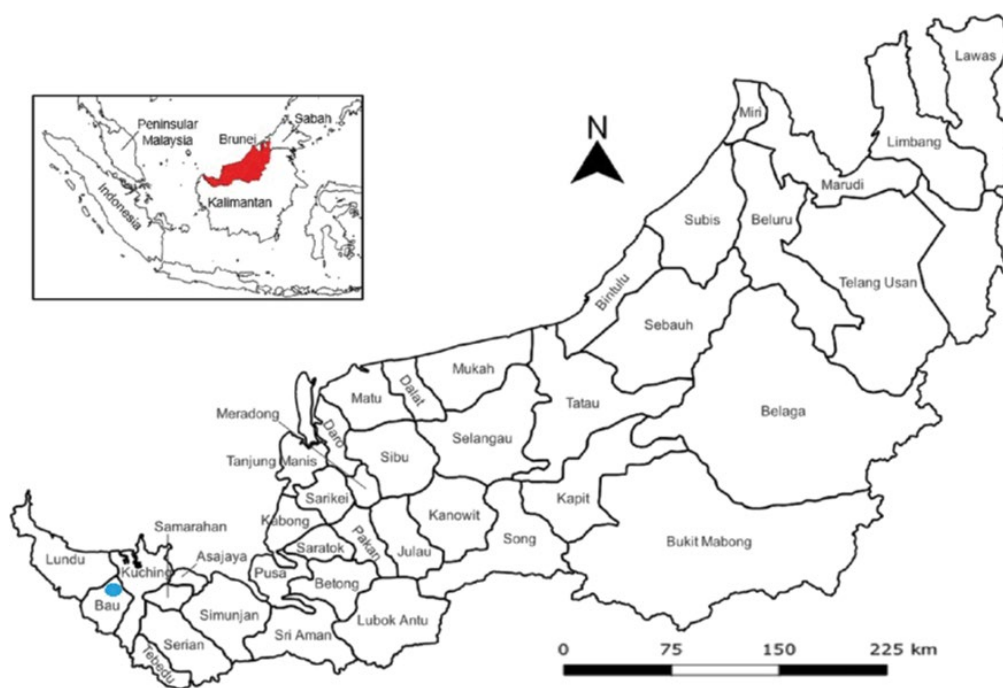


Figure 1: The red colour indicates the map of Sarawak, while the blue colour denotes the locality of mosquito larval collection in Kampung Tringgus, Bau, within the Kuching Division, Sarawak. (Sources: Land and Survey Department)