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INSECTICIDE RESISTANCE IN ADULT *AEDES* MOSQUITOES

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Abstract

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In a response to mosquito-borne disease such as dengue outbreak from time to time, the susceptibility of *Aedes* mosquitoes was assessed to identify the 50% knockdown time (KT_{50}) of adult *Aedes* mosquitoes to malathion insecticide. The KT_{50} value was applied to determine the insecticide resistance ratio by comparing field strain with laboratory susceptible strain. World Health Organization (WHO) standard procedure was used namely adult bioassay using WHO Diagnostic Test Kit to determine the resistance ratio based on the knockdown time (KT) of wild strain to laboratory susceptible strain. The *Aedes* mosquitoes were bred from larval collected from two localities which are Shah Alam and Bangsar. About 300 samples were exposed to malathion insecticide impregnated paper for one hour. Knockdown mosquitoes were recorded each five minutes in one hour exposure. Mortality number was count after 24 hours. The laboratory susceptible strain from Vector Control Research Unit (VCRU), USM was used as a susceptible strain for comparison purpose in determination of resistance ratio. The adult bioassay test was carried out by using diagnostic dosages of 5.0% malathion. All bioassay results were subjected to probit analysis. The results exhibited the wild strain mosquitoes from Shah Alam shown a possibility of potency to insecticide resistance where the resistance ratio is 2.2 with 95% mortality. In contrast, wild strains from Bangsar were believed to develop insecticide resistance based on resistance ratio value 2.4 with 78% mortality. Thus, the present used of malathion with concentration 0.03 were not effective in killing the adult *Aedes* mosquitoes.

Key words: *Aedes* mosquitoes, adult bioassay, resistance, malathion, resistance ratio

CHAPTER I

INTRODUCTION

1.1 Study background

Dengue fever is an acute febrile viral disease caused by the viruses of dengue fever which include serotypes 1, 2, 3 and 4. The epidemic of dengue had established in most tropic countries including southern Cambodian, China, Indonesia, Myanmar, Malaysia, Philippines, Thailand, Vietnam, Bangladesh, India, Pakistan and Sri Lanka. Monkeys and human are the reservoir for the virus where monkey act as the primary reservoir of the viruses. The first reported epidemics of DF occurred in 1779-1780 in Asia, Africa, and North America (Heymann, 2004). This indicates that these viruses and their mosquito vector have already had a worldwide distribution in the tropics for more than 200 years. Multiple infections of serotypes which contribute to dengue haemorrhagic fever (DHF) have emerged in the Pacific region and the Americas. In Southeast Asia, epidemic DHF first appeared in the 1950s, but by 1975 it had become a frequent cause of hospitalization and death among children in many countries in that region (Centers for Disease Control and Prevention, CDC, 2008).

In Malaysia, dengue fever (DF), an acute febrile viral disease was first reported in 1902 and is now one of the major public health problems in Malaysia, especially with the emergence of dengue haemorrhagic fever (DHF) in 1962 (CDC, 2008). Dengue haemorrhagic fever and its subsequent dengue shock syndrome are the severe viral illness that may lead to more worsen cases. Notification of DF and DHF was instituted in 1971, requiring all medical practitioners to report any case of confirmed or suspected dengue or dengue haemorrhagic fever to the nearest health office. Prevention and control of DF and DHF was further strengthened with the