

# Behavioural responses of deltamethrin- and permethrin-resistant strains of *Aedes aegypti* when exposed to permethrin in an excito-repellency test system

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## Abstract

This study compared the behavioural avoidance responses of the permethrin-resistant and deltamethrin-resistant strains of *Aedes aegypti*, a primary vector of dengue haemorrhagic fever (DHF) in Thailand. The background of biochemical-based resistance mechanism assay of these two strains revealed a significant increase of esterase activity and monooxygenase levels when compared with a laboratory-susceptible strain. Glutathione-S-transferase activity was found to increase only in the permethrin-resistant strain. The DNA sequence of knockdown resistance (*kdr*) mutation in the voltage-gated sodium channel (IIS6 region) was determined but the leucine to phenylalanine amino acid substitution, which is commonly associated with resistance to pyrethroids in many insect species, was not found in either strain. The behavioural escape response of both contact irritancy and non-contact repellency when exposed to permethrin at standard field dose (0.25 g/m<sup>2</sup>) was observed by using an excito-repellency test chamber. The results showed that in contact trials, the permethrin-resistant strain showed a lower irritancy response when compared with the deltamethrin-resistant strain. This was probably due to the higher levels of resistance to this insecticide for the permethrin resistance strain. For the repellency test by non-contact trials, the response was not significantly different between the two strains. This may be because the repellency effect was much weaker than that of the irritancy effect. This study indicated that the behavioural response of mosquitoes differs according to different pyrethroid compounds and to the physiological resistance mechanism of the mosquitoes. However, further work is necessary to understand how these responses are mediated.

**Keywords:** Behavioural response; *Aedes aegypti*; Insecticide resistance; Excito-repellency test chamber.

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