

Suntorn Pimnon 2012: Established Diagnostic Doses of Six Synthetic Pyrethroids, Currently Used for the Control of *Aedes aegypti* L., a Vectors of Dengue. Master of Science (Entomology) Major Field: Entomology, Department of Entomology. Thesis Advisor: Miss Waraporn Juntarajumnong, Ph.D. 81 pages.

Establishing baseline insecticide discriminating doses is crucial in accurately determining susceptibility status and changing temporal patterns of physiological response in mosquito populations. Synthetic pyrethroids are the predominant chemicals used for controlling adult *Aedes aegypti* and *Aedes albopictus*, both vectors of dengue viruses, in Thailand. Presently, only 2 synthetic pyrethroids, (permethrin and *lambda*-cyhalothrin), have published diagnostic dose rates for monitoring *Ae. aegypti* insecticide resistance. This study established the diagnostic lethal concentrations (LC) for six different synthetic pyrethroids active ingredients available in Thailand for dengue vector control. The United States Department of Agriculture (USDA) insecticide-susceptible strain of *Ae. aegypti* was used to establish the baseline concentrations for subsequent susceptibility testing of field populations. Our findings obtained lower discriminating concentrations for *lambda*-cyhalothrin and permethrin than recommended by WHO, at 2.5 and 1.7-fold lower dosing, respectively. The susceptibility status of three different geographical populations of field collected *Ae. aegypti* were tested using standard WHO procedures. All three field strains demonstrated varying levels of physiological resistance to each compound. Strong physiological resistance to permethrin was seen in the Nong Khai populations (6% mortality) and to deltamethrin from Khon Kaen and Nong Khai (4% mortality). We conclude that establishing the true baseline diagnostic concentration of an insecticide is of paramount importance in accurately determining the susceptibility status in field collected mosquitoes. If possible, discriminating doses should be established for all insecticides and test assays run concurrently with a known susceptible strain for more accurate monitoring of resistance in mosquito populations in Thailand.

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