Piti Mongkalangoon 2011: Experimental Huts Study to Evaluate the Behavioral Responses of *Aedes aegypti* to Synthetic Pyrethroids Used in Vector Control under Field Condition. Doctor of Philosophy (Entomology), Major Field: Entomology, Department of Entomology. Thesis Advisor: Professor Theeraphap Chareonviriyaphap, Ph.D. 112 pages.

The main objective of this study was to find the optimal dosage of deltamethrin, cyphenothrin, d-tetramethrin, and tetramethrin that would elicit repellency and irritability responses in *Aedes aegypti*. The F1-F3 generations of field mosquitoes collected from Pu Teuy Village, Sai-Yok District, Kanchanaburi Province, Thailand, were tested with four pyrethroids to determine the LC_{25}, LC_{50}, and LC_{99}. These concentrations were 0.010%, 0.020%, and 0.055%, respectively, for deltamethrin; 0.113%, 0.167%, and 0.353%, respectively, for cyphenothrin; 2.091%, 2.770%, and 5.114%, respectively, for d-tetramethrin; and 2.377%, 4.251%, and 10.715%, respectively, for tetramethrin. All dosages were tested in the excito-repellency system. Survival analysis was used to compare each chamber of the test. Cyphenothrin had a stronger repellent effect than the other pyrethroids, while the contact irritant effect was similar among compounds tested. The LC_{50} of each pyrethroid was found to be the optimal dose for repelling *Ae. aegypti*. There was no significant difference when compared with LC_{99} values for either noncontact or contact trials for each pyrethroid, $p>.05$, 0.077 and 0.624, respectively, for deltamehrin; 0.266 and 0.916, respectively, for cyphenothrin; 0.610 and 0.280, respectively, for d-tetramethrin; and 0.276 and 0.291, respectively, for tetramethrin. In the field test, we used two experimental huts, 4 x 5 x 2.5 m in width, length and height. The results indicated that the impact of insecticides on vector populations is much more complex than just toxicity. They can function as repellents (spatial repellency) and as irritants (contact irritancy). Even though, all four insecticides tested in the excito-repellency system demonstrated a contact irritancy effect, the experimental hut tests showed only two insecticides had this property, i.e. deltamethrin and cyphenothrin. We found that cyphenothrin had both a spatial repellent and contact irritant effect in the field tests while deltamethrin did not. D-tetrametrin and tetramethrin data from the field were not in agreement with the results from the excito-repellency system tests.

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