

## **Susceptibility among Dengue Vectors to Malathion and Deltamethrin Insecticides in Three Selected Medical Officer of Health (MOH) Areas in the District of Gampaha, Sri Lanka**

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Dengue has become the most important public health problem in Sri Lanka at present. As there is no effective vaccine or drug up to now, vector control is the main arm of disease control. Of these approaches, insecticide based control is used widely. However, excess use of chemicals and inappropriate application without determining the discriminative doses has given rise to the insecticide resistance among vector mosquitoes. Entomological surveys (Ovitap) were conducted in Negombo, Attanagalla and Dompe Medical Officer of Health (MOH) areas representing Urban, Sub urban and rural conditions, respectively from December 2016 to June 2019. A total of 100 ovitraps each was placed outdoor and indoor in randomly followed by the collection after 5 - 7 days. Eggs collected from ovitraps were reared under laboratory condition the laboratory (Temperature;  $27 \pm 10^{\circ}\text{C}$ ; Relative Humidity 70 - 80%). The reared larvae were identified using standard taxonomic keys. Identification was further confirmed by identification of adults emerged from larvae. Adult mosquitoes were reared under optimized insectary conditions provided with sugar feeding. Batch of 140 mosquitoes from *Aedes aegypti* (Linnaeus) and *Ae. albopictus* (Skuse) was taken separately from the colony 24 hours after a sugar feeding. Each batch of mosquito was exposed to malathion (0.8%) and Deltamethrin (0.03%) insecticide susceptibility following the World Health Organization (WHO) defined procedures. The experiment setup was repeated for 2 times. Mortality and corrected mortality was calculated using Abbott's formula after 24 hours' exposure period. The results indicate that both dengue vectors have evolved high level of insecticide resistance to malathion (0.8%) and deltamethrin (0.03%) in the District of Gampaha except *Ae. albopictus* mosquitoes in rural areas. *Ae. albopictus* mosquitoes were found fully susceptible for 0.03% deltamethrin in Dompe (rural) MOH area and emergence of resistance (95.9%) was observed in Attanagalla (suburban) area. It was found resistant in Negombo area (83.8%) which is highly populated. *Ae. albopictus* mosquitoes were found fully resistant for 0.8% malathion in both urban (71.5%) and Sub urban (85.3%) areas while emergence of resistance was observed in Dompe MOH area (90.8%). *Ae. aegypti* was found resistance to both 0.03% deltamethrin and 0.8% malathion in Negombo area (88.1%, 53.5% respectively) and resistance was suggested for 0.03% deltamethrin in Attanagalla MOH area (91.8%) while it was found resistant for 0.8% malathion (89.8%) in the same area. *Ae. aegypti* was not recorded in Dompe MOH area during the study period. Since both the dengue vectors have developed resistance to WHO diagnostic discriminative doses for Malathion and deltamethrin intensity bioassays (five times and ten times of discriminative dose) are needed to be done to confirm the level of resistance in these vectors. Therefore, results highlight the requirement of continuous insecticide resistance monitoring incorporated with the surveillance and control efforts. Hence, use of evidence based discriminative doses of insecticide for each area should be vital to delay the development of resistance among natural population.

Keywords: “*Aedes*, insecticide, resistance; Susceptibility; monitoring”

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