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### Evaluation of organophosphate and pyrethroid insecticides against *Aedes aegypti* in Gangodawila Public Health Inspectors (PHI) area

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Dengue is the most common arboviral disease in Sri Lanka. Control of dengue fever (DF) is mainly done by vector control and clinical management. Vector control includes source reduction through destroying of larval habitats and chemical control by the means of insecticides and larvicides. Continuous exposure to a particular insecticide has resulted in insecticide resistance in vector populations. Proper monitoring of resistance in vectors, provides a picture of the effectiveness of insecticides used. In order to investigate the resistance of *Aedes aegypti* mosquitoes to commonly used insecticides, a study was carried out in selected study areas: Gangodawila, Udahamulla and Delkanda of Gangodawila PHI area, Nugegoda Medical Officer of Health (MOH) division. *Ae. aegypti* mosquitoes from three selected study areas were collected. For each location, World Health Organization (WHO) recommended larval and adult insecticide susceptibility tests were performed using deltamethrin (0.05%) and permethrin (0.75%) of pyrethroid group, malathion (5%) of organophosphate group (n = 1125) as adulticides and temephos (n = 375) of organophosphate group as a larvicide. For adult bioassays, the percentage of mortality (highest to lowest respectively) was recorded as follows: for permethrin, from Udahamulla (54.35%), Gangodawila (52.37%) and Delkanda (28.03%); for deltamethrin, from Delkanda (78.31%), Gangodawila (64.75%) and Udahamulla (51.11%); and for malathion, from both Delkanda and Gangodawila (100%) and Udahamulla (98.77%). In all locations, the adult mortality rates were below the standard mortality rate for detection of resistance (90%) for the pyrethroid adulticides permethrin and deltamethrin. Thus insecticide resistance for pyrethroid adulticides was observed in the populations tested. The larval susceptibility test revealed a percentage of mortality for temephos (highest to lowest) as follows: in Gangodawila (45%), Udahamulla (39%) and Delkanda (31.75%). Hence insecticide resistance developed against the organophosphate larvicide was revealed for the population tested. The study highlighted the importance of examining insecticide resistance of a target population prior to chemical control approaches. Further, the low efficacy of using pyrethroid insecticides and the comparative high potential of malathion as an alternative for effective *Ae. aegypti* vector management was suggested.

**Keywords:** Dengue, *Ae. aegypti*, insecticide resistance, adulticide, larvicide

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