

PREVALENCE AND MALATHION RESISTANCE IN *Aedes* VECTOR MOSQUITOES IN KANDY, SRI LANKA

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Aedes aegypti and *Aedes albopictus* are the vectors of dengue fever and dengue hemorrhagic fever in Sri Lanka. The present study was carried out to determine breeding preferences, egg laying patterns, malathion resistance and underlying resistance mechanisms of *Aedes* mosquitoes in South-West Municipal area of Kandy. Egg laying pattern of *Aedes* was studied using ovitraps (five per site) at 24 hour intervals from 31st October to 15th December 2005 at three different habitats namely; Peradeniya University Campus, Aniwatte (a residential area) and Uda- Peradeniya (a village area with a forest in the vicinity). *Ae. albopictus* was the only vector species of dengue in the study area, while *Ae. aegypti* was not observed in any of the habitats during the period of study. A total of 2738 eggs of *Ae. albopictus* were collected from all 3 sites and the highest number 1136 were collected from Uda- Peradeniya (41.5%) followed by University premises (929 eggs, 33.9%) and Aniwatta (673 eggs, 24.6%). The rate of oviposition increased with the onset of rain.

Breeding preference and malathion resistance studies were carried out at Rajawatta area. Larval collections were carried out during 01st May 2006 to 01st June 2006 from 50 home gardens. Larval identifications revealed widespread prevalence of *Ae. albopictus* mosquitoes in the area. The highest larval density (0.67 ml⁻¹water) was recorded from brown glass bottles. Analysis of data showed that the Larval Indices in houses, Container and Breteau Indices in the study site were 7%, 56.6% and 9% respectively indicating that the area is under epidemic risk. The proportional positive rate was highest in miscellaneous containers (12.66%), followed by leaf axils (9.9%), bottles (7.63%) and flower pots (1.785%).

Larvae were reared through to adults for insecticide bioassays. Adults (n = 100) were exposed to malathion (0.8%) impregnated papers using World Health Organization (WHO) bioassay test kits. Results indicated that 31% of *Ae. albopictus* population was resistant to malathion. To determine the sensitivity of malathion to target site acetylcholinesterase (AChE), and the activity of malathion metabolic enzymes, biochemical assays (n = 200) were carried out using a kinetic plate reader according to WHO standards. About 20% of the population had altered target site mechanism (insecticide insensitive AChE) providing resistance to malathion. Higher mean specific activities of glutathione S-transferases (0.950 $\mu\text{mol min}^{-1} \text{ml}^{-1}$ with the substrate 1-chloro 2,4-dinitrobenzene) and carboxylesterases (0.386 $\mu\text{mol min}^{-1} \text{ml}^{-1}$ with the substrate p-nitrophenyl acetate) indicated the presence of glutathione S-transferase and carboxylesterase based metabolic resistance in this population.

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