

Insecticide Susceptibility Status in *Aedes albopictus*, in Selected Areas in Colombo District

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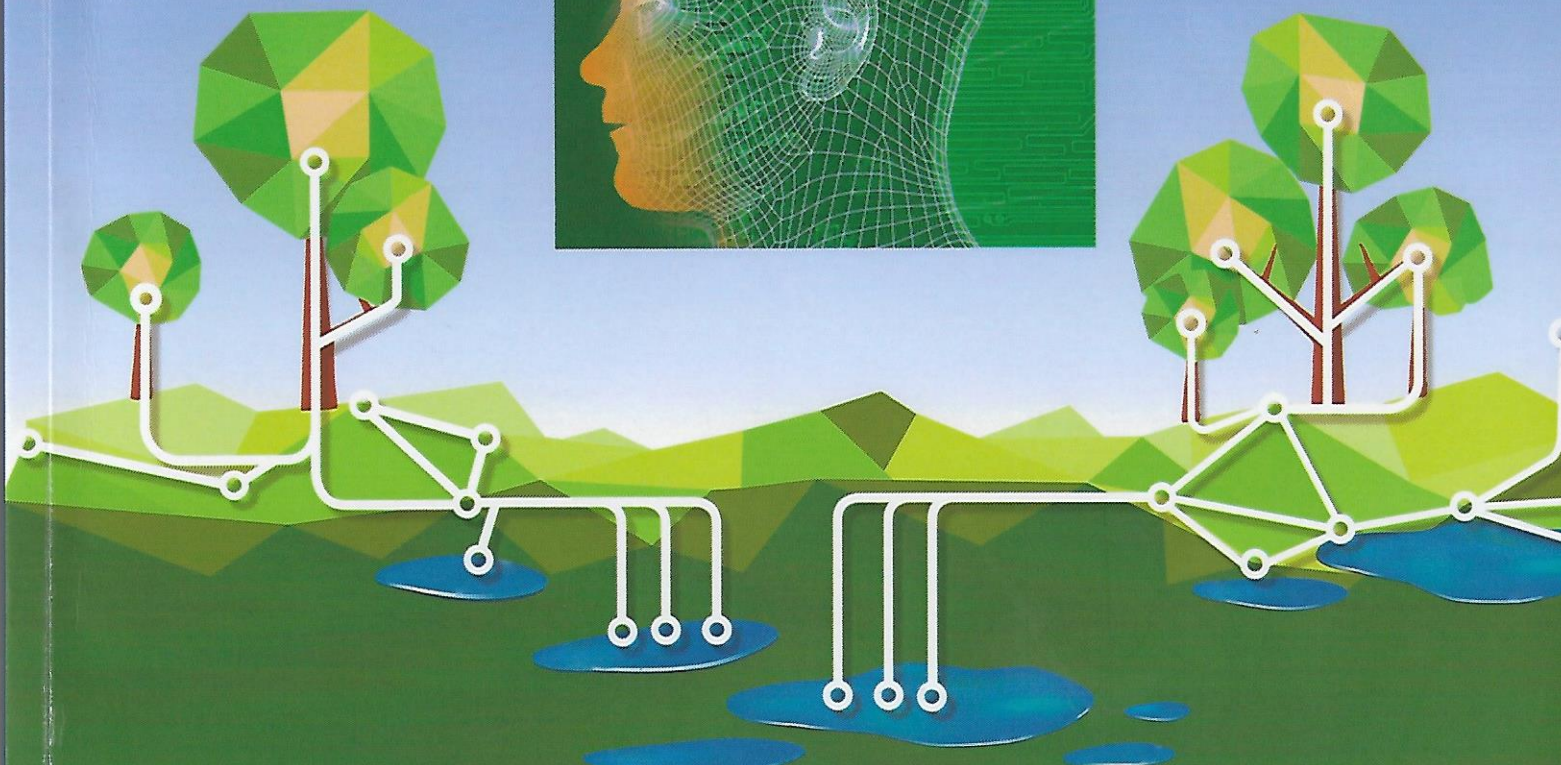
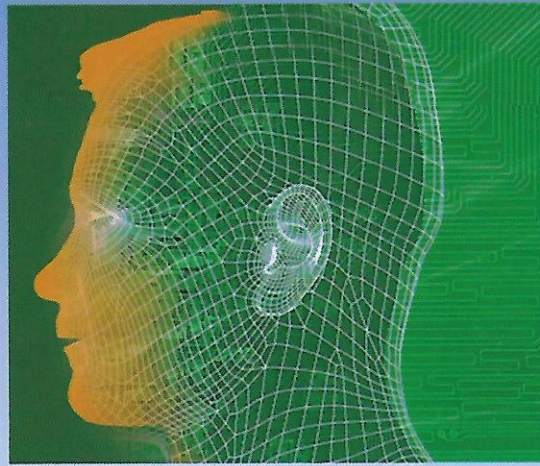
Abstract

Aedes albopictus (Skuse) is considered as the secondary vector of dengue viral transmission in Sri Lanka. As it is dominated throughout the semi urban and rural areas, the risk of Dengue is known to be maintained by, them. In the absence of anti-viral medication and with limited availability of a commercial vaccine for public health use, vector control remains an effective means for reducing disease morbidity. Knowledge about genetic mutations associated with insecticide resistance (IR) is a prerequisite for developing rapid resistance diagnosis, and the distribution and frequency of IR conferring mutations are important information for making smart vector control decisions. A phenylalanine (F) to cysteine (C) substitution at position 1,534 within the third domain of the voltage gated sodium channel (NaV) is associated with resistance to type I pyrethroids, permethrin and type II pyrethroids, deltamethrin. The purpose of this study was to identify the pyrethroid resistance status and to detect the mutation and its frequency in *A. albopictus* in selected areas. Eggs were collected from two dengue high risk areas in Colombo district. Samples were reared to adulthood and their resistance status against above insecticides was determined by standard WHO susceptibility bioassays. Both populations assessed by adult bioassays were susceptible to both insecticides. Thirtyinsects from each susceptible population were then genotyped for the F1534C mutation. All the PCR products were separated on 3.5% agarose gel and visualized by UV transillumination. Towards both insecticides the overall susceptibility was 100% ($\geq 98\%$ mortality: Susceptible), in all two areas. There was no mortality among control mosquitoes. Nevertheless heterozygotes of approximately 90 and 110 bp, corresponding to alleles 1534 Phe⁺ and 1534 Cys^{kdr} respectively were observed in susceptible genotypes from semi urban areas in Colombo. A slow frequencies of the 1534 Cys^{kdr} (0.150–Maharagama permethrin susceptible population and 0.050–Rattapitiya Deltamethrin susceptible population) were found in our study, there is a selection pressure with PY favoring the homozygous *kdr* in the studied localities. Therefore we suggest that this mutation has been just emerged or reversed to 1534 Phe⁺ over generations through time.

Keywords: Knock-down resistance, Voltage gated sodium channel, Pyrethroid, *Aedesalbopictus*, Insecticide resistance

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