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Detecting of Knock Down Resistance (*kdr*) F1534C Allele in the Dengue Vector *Aedes aegypti* in Colombo South Peri-Urban Areas

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A *phenylalanine* (F) to *cysteine* (C) substitution at position 1534 within the third domain of the NaV is associated with resistance to the type I pyrethroid, permethrin, among populations of *Aedes aegypti*, the main vector for the dengue virus. Eggs were collected from three dengue high risk MOH areas in Colombo district. Samples were reared to adulthood and their resistance status against permethrin was determined by standard WHO susceptibility bioassays. Permethrin-resistant insects were then genotyped for the F1534C mutation. All the PCR products were separated on 3.5% agarose gel and visualized by UV trans-illumination. Overall susceptibility was 58.3%, with mortality rates varying widely from 12.0 % to 61.0%. Samples obtained from all three sampling sites showed high degrees of incipient resistance (<80% mortality). There was no mortality among control mosquitoes. Amplicons of approximately 90 and 110 bp, corresponding to alleles 1534 Phe⁺ and 1534 Cys^{kdr} respectively, were observed in all the resistant genotypes. The highest C allele frequency (0.847) was obtained from Nugegoda, Gangodawila PHI area, and the lowest C allele frequency (0.543) was obtained from Dehiwala, Nedimala PHI area. The C allele frequency obtained from Maharagama, Jambugasnulla PHI area was in between (0.657). The 1534C mutation was significantly and positively associated with permethrin resistance in the selected areas of Sri Lanka. However, the resistance in these populations cannot be explained only due to *kdr* mutations and indicates that other resistance mechanisms are also operating. The results of the present study would help health authorities to use appropriate insecticides in each administrative area to delay the onset of resistance and to use appropriate insecticides to get the maximum effect through space spraying.

Keywords: knock-down resistance (*kdr*), voltage gated sodium channel (NaV), permethrin, *Aedes aegypti*, dengue, resistance, mutation, Sri Lanka

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