BS2.

CURRENT STATUS OF INSECTICIDE RESISTANCE IN MOSQUITO VECTORS OF DANGEROUS HUMAN DISEASES IN SRI LANKA

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Resistance levels to synthetic insecticides and underlying resistance mechanisms were investigated in six species of mosquito vectors. *Anophelus culicifacies* and *An. subpictus* (vectors of malaria) were collected from Galewela, Matale using bovine baited trap huts. *Culex tritaeniorhynchus* and *Cx gelidus* (vectors of Japanese encephalitis) were from Anuradhapura using CDC light traps hung in piggeries. *Aedes aegypti* and *Ae. albopictus* (vectors of dengue) were from Kandy by human baited catches.

Adult mosquitoes were exposed to insecticide impregnated papers using World Health Organisation bioassay test kits and log-probit mortality curves were established. Activity levels of carboxylesterases, glutathione-S-transferases and oxidases, which metabolize insecticides before they reach the insect target sites, were investigated using biochemical assays. Quantitative changes of carboxylesterases were detected by native polyacrylamide gel electrophoresis. Qualitative changes were studied by detecting the rates of malathion metabolism. Resistance of the insect target site, acetylcholinesterase, to insecticide inhibition was tested biochemically.

Very high resistance to the organophosphate malathion was shown by *An. culicifacies* (70% of the population) and *Cx tritaeniorhynchus* (65%). High resistance to the carbamate propoxur was shown by *Cx. tritaeniorhynchus* (53%) and *Ae. aegypti* (44.5%). Anopheline and *Aedes* populations showed a low resistance to the pyrethroid permethrin (~25%). All the species, except *C. gelidus* were highly resistant to DDT (62.4% - 100%). Resistance of all six populations to newly introduced pyrethroids *ie.* deltamethrin, cypermethrin and lambda cyhalothrin was negligible (0% - 18%). Acetylcholinesterase, the target site of organophosphates and carbamates, is altered in a high proportion of all mosquito populations. Glutathione-S-transferases and oxidases significantly contribute to the resistance shown by anopheline vectors. Elevation (qualitative changes) of carboxylesterases was not detected only in *An. subpictus* and *C. gelidus*. Presence of qualitatively different carboxylesterases, which metabolize insecticides at a faster rate, was found only in anopheline populations.