

INSECTICIDE RESISTANCE IN SELECTED *CULEX* MOSQUITO SPECIES IN SRI LANKA

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Culex mosquitoes are widely distributed with a broader host range and are possible vectors of emerging infectious diseases. Thus, continuous assessment of their responses to mosquito control approaches is essential. This study aimed to determine the insecticide resistance mechanisms of *Culex quinquefasciatus*, *Cx nigropunctatus* and *Cx sitiens* in Sri Lanka. Mosquito samples were collected from Kandy, Kurunegala and Puttalam districts. Collected samples were tested to determine the activity levels of detoxifying enzymes and Acetylcholinesterase insensitivity to Organophosphates and Carbamates. Biochemical assays were conducted according to the procedures outlined by the World Health Organization. From each population >200 mosquitoes were subjected to Protein, Esterase (ES), Glutathione-S-transferase (GST), Monooxygenase (MO), and Acetylcholinesterase (ACE) assays. Relatively high specific activity levels of ES ($1.01 \pm 0.2 \mu\text{mol mg}^{-1} \text{min}^{-1}$) and remaining activity levels of ACE (87.05±15.12%) were reported from *Cx quinquefasciatus* from Kurunegala. Specific activity levels of GST for *Cx quinquefasciatus* populations from Kurunegala and Peradeniya were 0.63 ± 0.09 and $0.6 \pm 0.11 \mu\text{mol mg}^{-1} \text{min}^{-1}$, respectively. A relatively high activity level of MO ($0.23 \pm 0.12 \mu\text{mol mg}^{-1} \text{min}^{-1}$) was reported from *Cx quinquefasciatus* from Peradeniya. *Cx sitiens* population, which was collected from forested habitats, showed relatively less activity levels for ACE (67.63±18.72%), GST ($0.44 \pm 0.14 \mu\text{mol mg}^{-1} \text{min}^{-1}$) and ES ($0.72 \pm 0.26 \mu\text{mol mg}^{-1} \text{min}^{-1}$). *Cx nigropunctatus* populations reported moderate activities for all tested enzymes. A significantly high enzyme activity levels of *Cx quinquefasciatus* ($p < 0.05$) populations suggested the relatively high resistance developed by these mosquito populations to all insecticide groups.

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