

Gunathilaka, P.A.D.H.N., M.A.S.T. Fernando, D.S. Premasiri, M.D. Hapugoda, P. Wijeyerathne, A. R. Wickremasinghe, & W. Abeyewickreme
Faculty of Medicine, University of Kelaniya

Paper: Sustainability

Morphological differences among *Anopheles subpictus* sibling species B breeding in waste water habitats in Mannar District, Sri Lanka

Anopheles culicifacies and *An. subpictus* are considered as the principal and subsidiary vector for malaria in Sri Lanka respectively. *An. subpictus* sibling species B has been specifically implicated in transmitting malaria in the coastal areas in the west coast of Sri Lanka. The main objective of this study was to identify morphological similarities and differences of *An. subpictus* B, breeding in waste water habitats in Mannar District.

Waste water breeding habitats in three sampling sites having a radius of 20 km in Mannar District were studied for one year (June 2010 to July 2011). These sampling sites were Mannar town, Vankalai and Silawathura. *Anopheles* larvae and water samples were collected from each breeding site. Larvae were reared until the adults emerged and identified to the species level by taxonomic keys. Densities of *Anopheles* larvae were calculated. Adult *An. subpictus* were prepared for egg laying. Sibling status was basically determined based on the number of ridges in the floats of egg with reference to the available keys. Further, other morphological characters were also examined. Water samples were checked for fourteen abiotic variables (pH, dissolved oxygen, conductivity, hardness, free Ammonia, total dissolved solids, colour, odour, suspended solids, alkalinity, conductivity, chloride, total iron and salinity).

Breeding of *Anopheles* species in waste water habitats was observed only in Silawathura and Vankalai sampling sites. A considerable number of *Anopheles* larvae were collected (n=1197): *An. subpictus* (96.6%), *An. nigerrimus* (2.25%), *An. barbirostris* (0.67%) and *An. pallidus* (0.5%). According to standards available for surface waters, qualities of water in selected habitats were in the ranges of third class quality. Egg character based on similarities in number of ridges in the egg, all *An. subpictus* belong to sibling species B. Although they belong to the same sibling species, they showed some morphological differences in their proboscis and palps. Some mosquitoes showed stunted lebellum in the proboscis and their palps had extended more than the length of proboscis (n= 632). Other members had extended lebellum in their proboscis compared to the length of pals (n=357).

With ecological changes mosquito sibling species may shift their breeding habitats in order to reduce competition and to attain a wide dissemination in the environment. It is difficult to determine sibling species status using morphological characters. The existing morphological variations and their use for identifying closely related anopheline mosquitoes, especially when they exist as species complexes, are imprecise and need to be replaced with DNA sequence-based techniques.

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