

**Distribution of major and potential malaria
vectors in Mannar and Trincomalee Districts
and systematics of anophelines in Sri Lanka**

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degree of Doctor of Philosophy of the Faculty of Medicine,
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VII. ABSTRACT

Background: Malaria was a major public health problem in Sri Lanka until recent past. Entomological surveillance is used to evaluate control programmes and facilitate interventions.

Objectives: To study on spatial, temporal, ecological, host preferences, and breeding habitats of major and potential malaria vector mosquitoes in selected sentinel sites in the Districts of Mannar (n= 3) and Trincomalee (n= 5) and to revise existing morphological keys of Sri Lankan anopheline mosquitoes.

Methodology: Densities of *Anopheles* were surveyed for a period of 25 months (June, 2010 to June, 2012) using World Health Organization recommended entomological techniques. Quality of water in breeding habitats was tested for abiotic variables. A multiplex, real-time Polymerase Chain Reaction (PCR) assay was developed to detect the host preference of *Anopheles*. Morphological identification keys for Sri Lankan anophelines were revised.

Results: A total of 161,891 anophelines representing 17 species were recorded from the Districts of Mannar (n=74,181) and Trincomalee (n= 87,710). The most abundant species was *Anopheles subpictus* (n=91,370). *An. culicifacies* was recorded only in Trincomalee (1.34%). *An. culicifacies* and *An. subpictus* have adapted to breed in a wide range of water bodies including polluted water in urban settings with low dissolved oxygen (<3 mg/l) and high salinity (21,105 ± 1,344 mg/l). Host preference

revealed that all anophelines preferred bovine as the host than humans. Anopheline morphological identification keys for both larvae and adults were revised.

Discussion: The adaptation of *An. culicifacies* and *An. subpictus* to breed in polluted water may lead the emergence of urban malaria in Sri Lanka, a phenomenon that has not been reported on a regular basis as yet. Therefore, continuous monitoring of the breeding of *An. culicifacies* in polluted water and to what extent it impacts on malaria elimination programmes is to be established. The presence of human blood, in some anopheline species indicates the possibility of transmitting human malaria. The revised morphological identification keys for anophelines can be used as a rapid and convenient guide to identify malaria vectors.

Conclusion: This investigation adds new information to the knowledge on malaria entomology. Therefore, this study would be beneficial to implement new vector control approaches.

Keywords: Entomological, programme, malaria, mosquitoes, *Anopheles*.