

BREEDING OF MALARIA VECTOR MOSQUITOES IN BUILT WELLS IN THE DISTRICT OF MANNAR, SRI LANKA

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Wells in rural areas and sub-urban areas with relatively clean water are the main breeding sites for Anopheline mosquitoes (Diptera: Culicidae). Knowledge on the existence of disease vectors in these remote and relatively inaccessible locations could improve epidemiologic understanding and control capabilities. This study identifies mosquito species, their relative abundance and physicochemical characteristics of water in built wells in the District of Mannar, Sri Lanka.

Four hundred and thirty two (432) samples of water from 48 built wells were taken at sampling locations in the District of Mannar from April 2013 - December 2013. A ladle dipper was used to obtain samples of larval mosquitoes. Larval species were identified microscopically using taxonomic keys. Physicochemical parameters such as temperature, Dissolved Oxygen (DO), pH, electrical conductivity, salinity, Total Dissolved Solids (TDS) and turbidity of the well water were measured *in-situ* using digital meters. Statistical correlation analysis and ANOVA were used to analyze the associations between physicochemical parameters and mosquito abundance.

Of 381 larvae, three species of Anopheline mosquitoes; *Anopheles subpictus* (96%), *An. varuna* (4%) and *An. peditaeniatus* (0.5%) bred in the built wells. However, the abundance of *An. subpictus* and *An. varuna* showed significant positive correlation ($p < 0.05$) with conductivity, salinity, DO, TDS and turbidity. Temperature and pH were negatively correlated with larval abundance of *An. subpictus* and *An. varuna* breeding in built wells. However, all physico-chemical parameters with *An. peditaeniatus* did not correlate significantly ($p > 0.05$). The samples mean (range) values of the seven parameters analyzed in the water samples were as follows; temperature = 30.71 (28.71-32.70) °C, pH = 7.77 (7.15-8.53), DO = 4.99 (2.97-6.93) mgL⁻¹, conductivity 1699 (493-6739) μScm⁻¹, salinity 875 (215-3562) mgL⁻¹, TDS 1137 (278-4537) mgL⁻¹ and turbidity 4.67 (0.26-24.90) NTU.

Built wells were identified as potential breeding habitats for secondary and other potential malaria vectors in the district of Mannar. There was variability in breeding of Anopheline mosquitoes in different habitats, which should be considered in control of mosquito breeding sites. Potential breeding sites in wells should be made inaccessible to adult female mosquitoes by placing removable covers, such as mosquito-proof lids or by fitting a wire mesh screen. Wells can also be made mosquito-proof by closing them with cement slabs and installing hand pumps.

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