

Variations in salinity tolerance of malaria vectors of the *Anopheles subpictus* complex in Sri Lanka and the implications for malaria transmission

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Abstract

Background: *Anopheles subpictus* sensu lato, a widespread vector of malaria in Asia, is reportedly composed of four sibling species A-D based on distinct cytogenetic and morphological characteristics. However *An. subpictus* species B specimens in Sri Lanka are termed *An. subpictus* B/ *An. sondaicus* because of recent genetic data. Differences in salinity tolerance and coastal/inland prevalence of *An. subpictus* sibling species that were not previously established in Sri Lanka are presented here. Results: Specimens with morphological characteristics of all four Indian *An. subpictus* sibling species were found in Sri Lanka. Sibling species A, C and D tended to be predominant in inland, and *An. subpictus* species B/*An. sondaicus*, in coastal localities. Sibling species C was predominant in both adult and larval inland collections. Larvae of *An. subpictus* B/*An. sondaicus* were found in inland and coastal sites, including a lagoon, with salinity varying from 0 to 30 ppt. *An. subpictus* sibling species A, C and D larvae were present in water of salinity between 0 to 4 ppt. *An. subpictus* C, D and *An. subpictus* B/*An. sondaicus* larvae showed compatible differential salinity tolerance in laboratory tests. The first instar larvae of *An. subpictus* B/*An. sondaicus* showed 100% survival up to 15 ppt in comparison to species C and D where the corresponding values were 3 ppt and 6 ppt respectively. However all third instar larvae of *An. subpictus* B/*An. sondaicus* survived up to 30 ppt salinity whereas *An. subpictus* C and D tolerated up to 4 ppt and 8 ppt salinity respectively. Conclusions: The results suggest that *An. subpictus* species B/*An. sondaicus* breed in fresh, brackish and nearly saline water while *An. subpictus* species C and D do so in fresh and less brackish waters in Sri Lanka, as in India. Because of the established role of *An. sondaicus* s.l. and *An. subpictus* s.l. as malaria vectors, the findings indicate a need for greater monitoring of brackish water breeding habitats in Asia. Tolerance to 15 ppt salinity may also constitute a simple method for differentiating *An. subpictus* B/*An. sondaicus* larvae from those of *An. subpictus* species C and D in field studies.

Indexed keywords

EMTREE medical terms: animal model; *Anopheles*; article; breeding; coastal plain; female; genetic database; laboratory test; larva; malaria; nonhuman; salinity; sibling; Sri Lanka; survival; animal; chemistry; classification; disease transmission; drug effect; drug tolerance; growth, development and aging; malaria; physiology; salinity

Species Index: *Anopheles subpictus*

EMTREE drug terms: inorganic salt; insecticide

MeSH: Animals; *Anopheles*; Disease Transmission, Infectious; Drug Tolerance; Female; Insecticides; Malaria; Salinity; Salts; Sri Lanka; Survival Analysis

Medline is the source for the MeSH terms of this document.