Anopheles culicifacies Y-chromosome dimorphism indicates sibling species (b and e) with different malaria vector potential in Sri Lanka

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Abstract

In Sri Lanka, malaria is transmitted mainly by Anopheles culicifacies Giles sensu lato (Diptera: Culicidae). In India, this nominal taxon comprises sibling species A, B, C, D and E, distinguished by their chromosome morphology. Species B (identified by polytene chromosome sequence Xab, $2g^1+h^1$) is not such an efficient vector of malaria as other members of the An. culicifacies complex in India. All specimens of An. culicifacies s.l. examined from Sri Lanka possess Xab, $2g^1+h^1$ polytenes, previously interpreted as species B, despite their important vector status. Recently, species E was described from Rameshwaram Island (Tamil Nadu, India) between Sri Lanka and the Indian mainland, where both species B and E are sympatric. Species B and E share polytene sequence Xab, $2g^1$ $+h^1$ but differ by the mitotic Y-chromosome being acrocentric in species B, submetacentric in species E, the latter implicated as vector of vivax malaria. From May 1999 to January 2000, we surveyed Y-chromosomes of male progeny from An. culicifacies Xab, $2g^1$ + h^1 females collected from cattle bait in diverse malarious districts of Sri Lanka: Badulla, Monaragala, Puttalam and Trincomalee. Karyotypes of readable quality were obtained from 42/83 families examined, with overall proportions 24% acrocentric and 76% submetacentric Y-chromosome carriers, both types being sympatric in at least 3/4 localities sampled. By analogy with the situation on Rameshwaram Island, we interpret these observations to demonstrate widespread presence of two members of the An. culicifacies complex in Sri Lanka, their karyotypes being compatible with species B and E, the latter predominant and having greater vector potential.

Author keywords

Anopheles culicifacies; Karyotype; Malaria; Malaria vectors; Mitotic metaphase; Polytene chromosomes; Sibling species; Sri Lanka; Y-chromosome

Indexed keywords

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MeSH: Animals; Anopheles; Cattle; Chromosome Banding; Female; India; Insect Vectors; Karyotyping; Malaria; Male; Plasmodium; Sri Lanka; Y Chromosome

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