ABSTRACT

Taxonomy and Biology of sandflies in selected districts in Sri Lanka; a combined molecular, morphological and ecological approach

Sri Lanka has been known for leishmaniasis and sandflies for a long time. The diversity of sandflies and their vectorial capacity have not been fully documented in the country. A survey was carried out in 8 districts which have recordings for sandflies and/or leishmaniasis. Two species from the genus *Phlebotomus* and 14 species from the genus *Sergentomyia* were identified based on morphology. Ten of them were reported for the first time from the country. *Phlebotomus (Euphlebotomus) argentipes* was the predominant species. *Ph. (Eup.) argentipes* was proposed as a species complex with morphologically similar 3 sibling species. Molecular data with 18S, 28S rDNA, ITS2 (nuclear markers) and cytochrome oxidase subunit I (*COI*) and cytochrome b oxidase (*cytb*) (mitochondrial markers) revealed the presence of two molecular types and possibly two sibling species. The sibling species (named as A) which was previously not reported to feed on humans was found to be anthropophagic and carry *Leishmania* DNA as well. The distribution pattern of the sibling species over a year tend to vary with peaks in dry months. The most influential environmental parameter affecting the distribution of sandflies is humidity. Their endophagic behaviour was also revealed. Phylogeny of the sandflies based on 18S, 28S ribosomal DNA (D3) and cytochrome oxidase subunit I (*COI*) and cytochrome b oxidase (*cytb*) sequence data was created and the monophyly of the oriental sandfly genera was challenged. The polyphly/paraphyly of the two major genera was recovered from the data. The proposed co-evolution pattern of the vector-parasite was also not revealed. The phylogenetic relationship among the subgenera of the oriental sandflies is reassessed and the most probable one is proposed. The relationship among the subgenera of the sandflies is also reassessed.