

# Molecular identification of potential leishmaniasis vector species within the *Phlebotomus* (*Euphlebotomus*) *argentipes* species complex in Sri Lanka

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## Abstract

**Background:** Leishmaniasis is an emerging vector-borne disease in Sri Lanka. *Phlebotomus* (*Euphlebotomus*) *argentipes* sensu lato Annandale and Brunette 1908 is suspected to be a potential vector. Three sibling species have been reported in the species complex based on analysis of morphological data. A study was carried out in different parts of Sri Lanka including cutaneous leishmaniasis prevailing localities to characterise the sibling species of *Phlebotomus* (*Euphlebotomus*) *argentipes* sensu lato and to establish their possible role in *Leishmania* transmission. **Methods.** Sandflies were collected using cattle baited trap nets and mouth aspirator. They were identified based on existing taxonomic keys. Sequences of amplified cytochrome oxidase subunit I (CO I), cytochrome oxidase b (cyt b), internal transcribed spacer 2 (ITS2), 18s and 28s rDNA regions were analysed to confirm the number of sibling species. Vectorial capacity of the sibling species was checked by detecting human and *Leishmania* DNA. **Results:** Sandflies collected using different techniques were processed for identification, parasite detection and molecular characterization. The 18s, 28s rDNA and cytochrome oxidase subunit I (CO I), internal transcribed spacer 2 (ITS2) and cytochrome b oxidase (cytb) sequences confirmed that the species belonged to the *Argentipes* complex. 18s and 28s sequences did not show any variation among the proposed sibling species. The phylogeny created from mitochondrial CO I and cytochrome b data and from the nuclear ITS2 region supports the existence of only two groups of flies (termed A and B) from *Phlebotomus* (*Euphlebotomus*) *argentipes* complex instead of the previously proposed three. The *Leishmania* mini-circle kinetoplastid, heat shock protein 70 (hsp70) and internal transcribed spacer I DNA along with human blood were detected from sibling species A only, which has not previously been considered to be a vector. **Conclusions:** The taxonomy of the Sri Lankan *Argentipes* species complex is reassessed based on the molecular data. The existence of two sibling species is proposed; sibling species A has a long sensilla chaetica (> 50% length of the second antennal flagellomere) and sibling species B has a short sensilla chaetica (< 50%). Sibling species A is incriminated as a vector for leishmaniasis in Sri Lanka.

## Author keywords

*Argentipes* complex; Leishmaniasis; Sibling species; Sri Lanka; Vector

## Indexed keywords

**EMTREE drug terms:** cytochrome b; cytochrome c oxidase; DNA 18S; DNA 28S; heat shock protein 70; internal transcribed spacer 2; oxidoreductase; ribosome DNA; unclassified drug

**EMTREE medical terms:** amino acid sequence; article; controlled study; gene sequence; Kinetoplastida; *Leishmania donovani*; nonhuman; parasite identification; *Phlebotomus argentipes*; phylogeny; sibling; skin leishmaniasis; species identification; taxonomy

**Species Index:** Bos; Kinetoplastida; Phlebotominae; *Phlebotomus argentipes*