

Incipient speciation in Brazilian populations of *Lutzomyia longipalpis*

Alexandre A. Peixoto
Department of Biochemistry and Molecular Biology
Instituto Oswaldo Cruz – FIOCRUZ, Rio de Janeiro, Brazil

The sandfly *Lutzomyia longipalpis* (Diptera:Psychodidae) is the main vector of visceral leishmaniasis in the Americas. Although this is believed to be a complex of sibling species, the status of different Brazilian populations is still somewhat unclear. In the last few years we have been carrying out a behavioural and molecular population genetics analysis of this important vector species and obtained evidence for the existence of a complex in Brazil. This includes the analysis of the songs produced by *L. longipalpis* males during copulation, and population genetics of sandfly homologues of two genes involved in the control of *Drosophila* lovesongs, *period* and *cacophony*. In addition, a more recent detailed analysis of the copulation songs produced by *L. longipalpis* males from six different populations shows a correlation between song differences and genetic divergence in the *period* gene, suggesting the existence of at least four sibling species in Brazil. We are currently extending the analysis of *period* to a number of other populations and the data has allowed an initial estimate of the geographical distribution of one of these siblings, which occurs along much of the coast of Brazil. However, although we detected significant divergence between the Brazilian species of the complex, we have also obtained evidence for introgression and/or maintenance of ancestral polymorphisms among the siblings, suggesting that they are in an incipient stage of speciation. Introgression between closely related vector species can have important implications for disease control as mutations conferring insecticide-resistance can spread from one species to another. Homologues of the *Drosophila* sodium-channel gene *paralytic* are associated with DDT and pyrethroid-resistance in a number of insect species. Interestingly, this gene is also involved in the control of *Drosophila* lovesongs. We have isolated a fragment of the sandfly *paralytic* gene and we are currently using it to study populations from different parts of Brazil. We are also initiating a multilocus analysis of the divergence and introgression between two sympatric siblings occurring in the locality of Sobral, Ceará State, in the Northeast region of the country.