Abstract

Leishmaniasis is one of the major neglected tropical diseases, which occurs in both the Old and New Worlds, affecting hundreds of thousands of people annually. In the Old World, human-infecting leishmanias are transmitted by sand flies of the genus *Phlebotomus,* whereas in the New World by species of the genus *Lutzomyia.* The disease has three main clinical manifestations, namely cutaneous, mucocutaneous, and visceral leishmaniasis. Algeria is year after year ranked second in the number of cases of cutaneous leishmaniasis. In Morocco, the number of cases per year is lower, however, leishmaniasis is there also a common disease. Understanding the transmission cycles in the foci of the infection may lead to better prevention of the disease.

In Morocco and Algeria, these *Leishmania* species occur: *Leishmania major* which causes zoonotic cutaneous leishmaniasis and is transmitted by *Phlebotomus papatasi, L. tropica*, causative agent of anthroponotic cutaneous leishmaniasis transmitted by *P. sergenti* and *L. infantum* which causes zoonotic visceral leishmaniasis and is transmitted by several of the subgenus *Larroussius,* for instance *P. perniciosus* or *P. perfiliewi.* Reservoir organisms include rodents, dogs and humans.

In the past, the species identification of sand flies depended on morphological keys. At present, methods of species identification based on molecular diagnostics are used as well. Currently, one of those mostly used is DNA barcoding which identifies sand fly species by a specific sequence of cytochrome oxidase I. MALDI-TOF protein profiling which distinguishes species-specific protein spectra is one of the more recently used molecular techniques for species identification of sand flies. I use both of these methods in my diploma thesis. In zoonotic transmission cycles, it is very important to determine reservoir hosts that may become a target for control measures to mitigate the transmission.

Blood meal analysis of engorged sand fly females may elucidate food preferences of vector species and the possible interruption of the leishmaniasis transmission cycle. In this thesis, I use three known markers for host identification, namely cytochrome B and prepronociceptin and a marker on a small ribosomal subunit. Another molecular technique for mass spectrometry is MALDI-TOF peptide mapping which determines a host analysing haemoglobin fragments.

This diploma thesis offers an overview of the results of the field collections in M'Sila and Quarzazate foci, the species identification of captured sand flies by morphological and molecular techniques, the detection of *Leishmania* sp. in the sand flies and rodents, the blood meal identification in engorged sand fly females and the DNA detection of wolbachia and plants in the sand flies.

Key words: Morocco, Algeria, leishmaniasis, *Phlebotomus, Leishmania,* reservoir host, host identification, DNA barcoding, mass spectrometry, MALDTI-TOF