

Report of *Lutzomyia longipalpis* (Lutz & Neiva, 1912) (Diptera: Psychodidae: Phlebotominae) in a cutaneous-leishmaniasis-endemic area of Panama

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Lutzomyia longipalpis is the primary vector of the parasite responsible for visceral leishmaniasis in the Americas. In the present study, *Lu. longipalpis* was found in a domiciliary area in Limón, a district in Capira, a region in which cutaneous leishmaniasis is endemic in Panama. Previously, this species has been found in a humid forest in this same region. Finding *Lu. longipalpis* in domiciliary areas indicates that this species may be adapting to new habitats and that it may play a role in the transmission of leishmaniasis in Panama.

Key words: *Lutzomyia longipalpis* - cutaneous leishmaniasis - visceral leishmaniasis - leishmania vectors - Panama

Lutzomyia longipalpis (Lutz & Neiva, 1912) (Diptera: Phlebotominae) is the primary vector of the parasite that causes visceral leishmaniasis in the Americas (Young & Duncan 1994). Leishmaniasis is a disease that principally affects the liver and the spleen. In Panama, approximately 3,000 cases of leishmaniasis per year are registered by the Ministry of Health and by the Gorgas Institute. However, the possibility of underreporting must be considered because the communities in which leishmaniasis is most common are far from health centres (Miranda et al. 2009).

Despite the medical relevance, the taxonomic status of *Lu. longipalpis* has not yet been defined. Studies carried out by Mangabeira (1969) have demonstrated that male specimens of *Lu. longipalpis* from the states of Pará and Ceará (Brazil) exhibit morphological differences in the third and fourth abdominal tergites. Later, several morphological and genetic analyses revealed significant differences among Brazilian populations and those distributed in Central America, Colombia and Venezuela, which led to the proposition of the existence of a species complex (Ward et al. 1983, Lanzaro et al. 1993, Arrivillaga & Feliciangeli 2001, Bauzer et al. 2007, Maingon et al. 2008).

The existence of the *Lu. longipalpis* complex is very important in the epidemiology of leishmaniasis. Zeledón et al. (1989) and Warburg et al. (1994) demonstrated that the transmission of *Leishmania infantum chagasi* by *Lu. longipalpis* in Brazil and Colombia results in visceral infections, whereas the transmission of the same parasite by *Lu. longipalpis* in Costa Rica results in non-ulcerative lesions. Comparative studies on the saliva

of these populations of Phlebotominae revealed differences in the chemical composition and the amount of maxadilan affect the proliferation of *Leishmania* and, consequently, the development of the disease (Warburg et al. 1994, Lanzaro et al. 1999).

The presence of *Lu. longipalpis* in Panamanian forests was first reported in the 1960s (Theodor 1965, Christensen 1972). Currently, however, there is little knowledge of its distribution, occurrence and participation in the transmission of leishmaniasis in Panama. The present study reports, for the first time, the occurrence of *Lu. longipalpis* in a domiciliary area in a region in Panama in which cutaneous leishmaniasis is endemic.

The sampling was carried out in June and August 2010 in Limón, the Campana region, the district of Capira, the province of Panama, in the Republic of Panama. This locality is situated at 8°41'14"N 79°54'3"W at an elevation of 506 m. According to Köepper's classification, the climate in the region is AW tropical wet and dry.

Specimens of Phlebotominae fauna were collected with the help of CDC light traps (Sudia & Chamberlain 1962) using an octanol solution as a supplemental mosquito attractant. The traps were installed in domestic and peridomestic environments at a height of 1.5 m and the collection period lasted 12 h (06:00 pm-06:00 am) for three consecutive nights. The captured individuals were placed on glass slides with the use of Berlese's medium for clarification and identification. The specimens were identified by José Dilermando Andrade Filho (National and International Reference Center for Phlebotomine Sand Flies, Belo Horizonte, MG, Brazil) using the scheme of Young and Duncan (1994).

Five females of *Lu. longipalpis* were collected in June, three inside a house and two in a peridomestic area, close to a henhouse. Two months later, four females and two males were captured in the same peridomestic area. *Lutzomyia gomezi*, *Lutzomyia panamensis* and *Lutzomyia trapidoi*, other species implicated as cutaneous leishmaniasis vectors, were also captured in the CDC light

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traps. The ability of *Lu. longipalpis* to adapt to changing environments has been observed in other countries (Souza et al. 2009, Acardi et al. 2010). The presence of *Lu. longipalpis* in domiciliary areas demonstrates that this species can easily adapt to domiciles and adjacent areas, increasing the risk of transmission of leishmaniasis in this region. It must also be highlighted that *Lu. longipalpis* was captured in an area where there was a small population. According to the records of the Ministry of Health, most of these people have already presented clinical manifestations of cutaneous leishmaniasis.

Four specimens of *Lu. longipalpis* were previously collected in Panama, from the forest of the Altos de Campana National Park (Garcés et al. 1999, Valderrama et al. 2008). This national park is a wild area protected by the environmental authorities and is located 16 km from the community of Limón. Therefore, the presence of *Lu. longipalpis* individuals near and inside a home in Limón suggests that this species is adapting to the degraded forest environment, possibly as the result of the search for new sources of food and shelter.

Limón is the oldest area of endemic transmission of cutaneous leishmaniasis in Panama. The occurrence number of this disease in this region is 15 cases per year, according to records of the Ministry of Health for 2009, and 95% of the people infected are non-residents.

It must be stressed that there are no records of visceral leishmaniasis in Panama despite the presence of various mammalian reservoirs of *Le. infantum chagasi* in South America (Rangel & Lainson 2003). In fact, it is common to see several sick dogs roaming in Limón. Given that these dogs could be infected with *Leishmania* parasites, these dogs could increase the risk of the spread of this disease. However, Zeledón et al. (1989) demonstrated that patients infected with *Le. infantum chagasi* by *Lu. longipalpis* in Costa Rica presented non-ulcerative lesions. In addition, Ponce et al. (1991) observed patients with clinical manifestations of both visceral and cutaneous leishmaniasis in the same transmission focus in Honduras. These reports suggest that the transmission of *Le. infantum chagasi* by the species *Lu. longipalpis* in Central America only results in cutaneous lesions.

However, the diagnosis of patients with cutaneous leishmaniasis through conventional tests (Montenegro test) is limited and has no specificity to differentiate the *Leishmania* species (Miranda et al. 2009). Thus, there have been discussions about the cases of cutaneous leishmaniasis detected in Limón as to whether the infections are really caused by *Leishmania* spp transmitted by Phlebotominae sand flies, vectors of cutaneous leishmaniasis recorded in Panama or by species of *Leishmania* transmitted by *Lu. longipalpis*, as observed by Zeledón et al. (1989) and Ponce et al. (1991).

Based on the observations reported and on the presence of *Lu. longipalpis* in Limón, a region in which cutaneous leishmaniasis is endemic in Panama, further studies focused on the ecological and epidemiological factors related to infection caused by *Leishmania* spp are needed. The assessment of *Lu. longipalpis* as a possible vector of leishmaniasis in Limón in particular should be verified because this is an ecotourism region.

Therefore, the detection of *Lu. longipalpis* in houses in areas degraded by deforestation demonstrates the need to intensify entomological surveillance, to constantly monitor the vector species and to evaluate the effect of human activities on sand fly populations and their wild hosts. Further, it is necessary to implement specific diagnostic techniques to differentiate the species of *Leishmania* and implement adequate control measures.

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