# An update on the epidemiology and transmission cycle of cutaneous leishmaniasis in Guatemala.

Poster 7

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## Introduction

- Cutaneous leishmaniasis (CL) affects the poorest populations of Guatemala where it is endemic.
- Ento-epidemiological research on CL became scarce after the 1990s.
- The main vector and non-mammal reservoir of CL are still unknown in the country.
- **Our objective was to update vector knowledge by characterizing the sand fly populations and *Leishmania* parasites circulating in Alta Verapaz, a CL endemic region in Guatemala.**

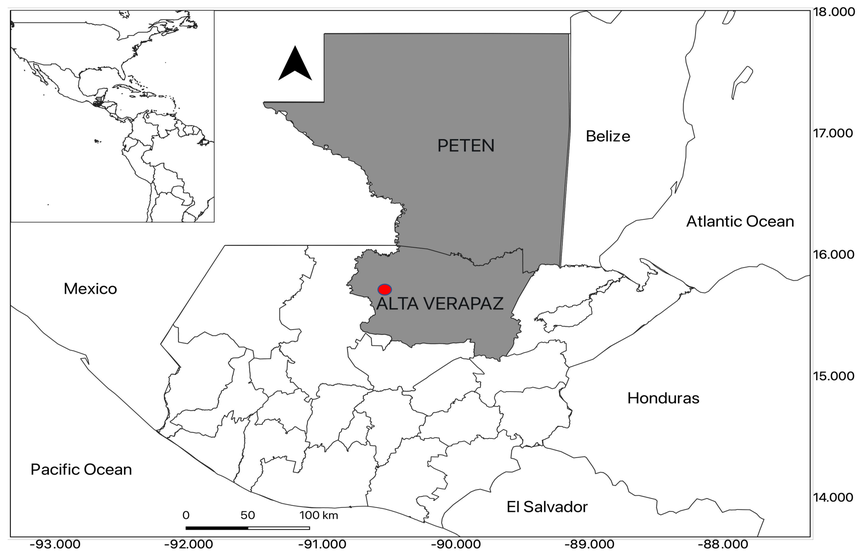
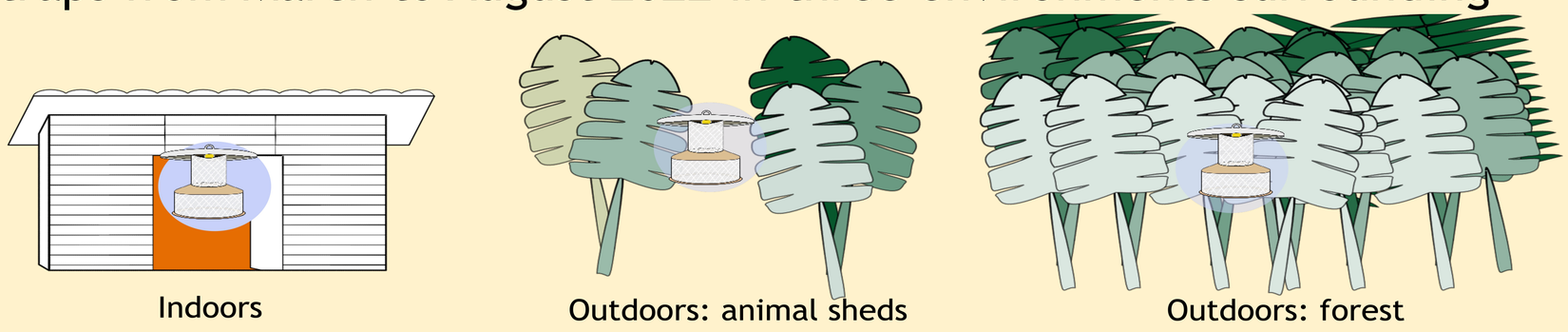



**Fig. 1:** Map of Guatemala. In grey, the two areas with the highest incidence of CL. Red dot: study site.

## Methods

- Sand fly collections with light traps from March to August 2022 in three environments surrounding cases households.

**Fig. 2:** Schematic representation of light trap placement.




- Identification of *Leishmania* parasites (*hsp70* PCR) in positive tissue smears collected and prepared previously by the Ministry of Health during routine CL diagnosis.
- Sand fly identified by cytochrome C PCR and screened for *Leishmania* DNA with *hsp70* PCR.

## Results

### 1. Sand flies

- 95 sand flies collected (79% females)
  - 44% (33/75) females collected indoors.
- 57% (49/86) identified sand flies are anthropophilic species

### 2. *Leishmania* parasites

- Leishmania DNA detected in three sand flies
  - *Ny. ylephiletor* and 2 unidentified species
- *Leishmania* confirmed in 11 patients
- Two new parasite species reported in the country.

**Table 1.** Sand fly species identified by COI PCR

| Species | Total | Percentage |
|---|---|---|
| *Bichromomyia olmeca* | 1 | 1.2 |
| *Brumptomyia* sp. | 3 | 3.5 |
| *Brumptomyia mesai* | 19 | 22.1 |
| *Dampfomyia beltrani* | 11 | 12.8 |
| *Dampfomyia deleoni* | 1 | 1.2 |
| *Lutzomyia* sp. | 1 | 1.2 |
| *Lutzomyia cruciata* | 22 | 25.6 |
| *Nyssomyia ylephiletor* | 26 | 30.2 |
| *Pintomyia robusta* | 1 | 1.2 |
| *Pintomyia serrana* | 1 | 1.2 |
| Total | 86 | 100 |

**Table 2.** *Leishmania* species identified by hsp70 PCR

| *Leishmania* species | Patients | Sand flies |
|---|---|---|
| *L. guyanensis* | 4 | 2 |
| *L. panamensis* | 4 | 0 |
| *L. braziliensis* | 1 | 0 |
| *L. guyanensis/panamensis* | 1 | 0 |
| *Leishmania* spp. | 1 | 1 |
| Total | 11 | 3 |

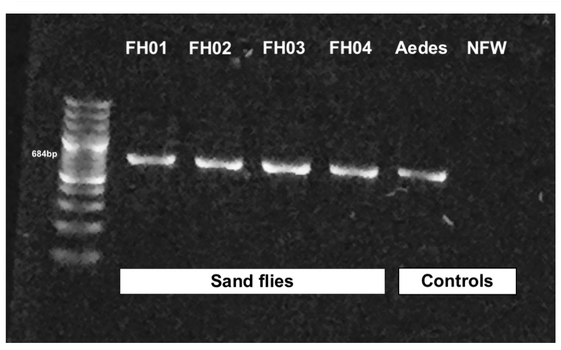



**Fig 3.** Agarose gel of Cytochrome C PCR to identify sand fly species by sequencing.

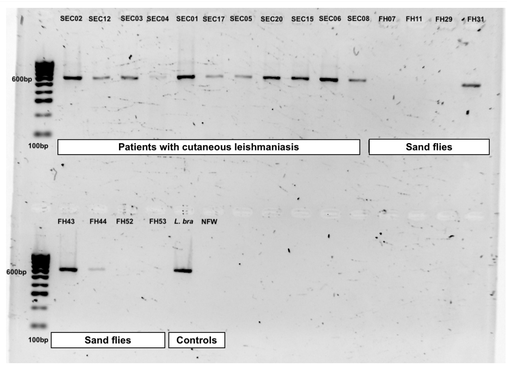



**Fig 4.** Agarose gel of hsp70 PCR to identify *Leishmania*. SEC = patients, FH = female sand fly, NFW = nuclease free water

## Conclusions and current work

- Indoor transmission? Anthropophilic sand fly *Nyssomyia ylephiletor* collected indoors, blood fed and positive for *Leishmania* DNA.
- *L. panamensis* and *L. guyanensis* confirmed in the country for the first time.
- Blood meal analysis of engorged sand flies and sequence analysis.