

# PHLEBOTOMINE FAUNA IN THE IMATACA FOREST RESERVE, STATE OF BOLIVAR, AND REPORT OF NEW SPECIES FOR VENEZUELA

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## Resumen

Se realizaron capturas de flebotomíneos en la reserva forestal de Imataca Venezuela, se recolectaron 139 ejemplares de *Lutzomyia* (137 hembras y 1 macho) y se identificaron 15 especies; *Lu. ricardwardi* (66.6%), *Lu. Chagasi* (20.2%), *Lu. runoides* (2.1 %) *Lu. ayrozai*, (1.4%), *Lu. davis* y *Brumptomyia* sp (1.4%), *Lu. triacantha*, *Lu. migonei*, *Lu. sericea*, *Lu. ovallesi*, *Lu. sp. de venezuela*, *Lu. flaviscutellata*, *Lu. psychodopygus*, *Lu. nuneztovari*, *Lu. squamiventris*, *Lu. Antunesi* (0.72%); *Lu. ovallesi*, *Lu. Flaviscutellata* son especies incriminadas en la transmisión de *Leishmaniosis*, *Lu. migonei* es una especie que en Venezuela ha sido encontrada con flagelados sin identificar en el intestino. Se presenta un inventario de las especies de *Lutzomyia* capturadas en esta región.

## Abstract

A new inventory of captured phlebotomines in the forest reserve of Imataca, Venezuela, is presented. 139 phlebotomines were collected with prevalence of *Lutzomyia* (*Nyssomyia*) *richardwardi* (Ready & Fraiha, 1978), with 92 (66.6 %) specimens; followed by *Lu. chagasi* (20.2%), *Lu. runoides* (2.1 %), *Lu. ayrozai*, (1.4%), *Lu. davis* y *Brumptomyia* spp. (1.4%); *Lu. triacantha*, *Lu. migonei*, *Lu. sericea*, *Lu. ovallesi*, *Lu. sp. of Venezuela*, *Lu. flaviscutellata*, *Lu. psychodopygus*, *Lu. nuneztovari* and *Lu. antunesi* (0.72%). *Lu. ovallesi*, is involved in transmission of *Leishmaniosis* (*Leishmania. panamensis*, *L. guyanensis*, *L. brasiliensis*); *Lu. flaviscutellata*, in transmission of *L. amazonensis* and *Lu. chagasi* in transmission of *L. brasiliensis*.

**Key words:** PHLEBOTOMINE SAND FLIES - IMATACA - LUTZOMYIA - BRUMPTOMIA - LEISHMANIOSIS

## INTRODUCTION

A

merican leishmaniasis has been primarily associated with forest areas in which phlebotomine sandflies maintain the cycle of transmission in wild reservoirs. Man acquires the infection when he goes into the forest and contacts the infected vector; these natural niches can remain undetected until susceptible people contact them directly or indirectly and become infected (Toro, 1976).

The Forest Reserve of Imataca, corresponding to the meridional sub-region, is located in the northeastern region of Venezuelan Guyana. In terms of geology, this region represents the oldest structure of the whole Venezuelan territory (Ewel *et al.*, 1968); occupying a total surface of 3'203.206 ha (MARNR 1992). It is classified as a transition between dry and tropical rain bio-climates, with an annual precipitation of 1000 - 1600 mm and an average temperature of 25 - 30 °C (Meteorological Station El Salto). All latter characteristics make this region an appropriate place for the survival of phlebotomine sandflies, potential vector of leishmaniasis (Osorno - Mesa *et al.*, 1967).

This preliminary study was carried out on December 1999, according to the reports of the studies conducted in Venezuela by specialists of the group (CIPA, 1999) (Felicangeli, 1988, 1991) (Felicangeli *et al.*, 1988), that stated that there were no previous studies about the inventory of phlebotomine fauna in the forest reserve of Imataca.

## MATERIALS AND METHODS

The research was performed in two locations of tropical rain forest (bh - T), according Holdridge classification, (mentioned by Espinal, 1992); concession CVG (8° 11' 14" N - 61° 44' 17" W) at 500 meters above sea level (masl) and La Montañita Camp (06° 16' 16" N - 61° 19' 28" W) at 200 masl; such locations correspond to Piar and Sifontes municipalities and are located in the northern and southern zones of the Forest Reserve of Imataca, respectively (figure 1).

For the capture of phlebotomines, Shannon type traps and manual capture over human bait during four consecutive nights between 18:00 and 21:00 hours, were used. Collected specimens were shipped in 100% isopropanol to the laboratory of Entomology of the Program of Study and Control of Tropical Illnesses (PECET - Programa de Estudio y Control de Enfermedades Tropicales) of University of Antioquia for their respective identification according their morphologic characters, following the taxonomic key of Young & Duncan, 1994.

Figure n° 1. Map of study area Imataca forest reserve.



## RESULTS

139 specimens corresponding to 14 species of genus *Lutzomyia* and 1 specie of the genus *Brumptomyia*, were captured. The number and percentage of species captured in each sampling station are shown in table 1.

In station 1, located in the south section of the reserve, few species were found: *Lutzomyia richardwardi*, *Lutzomyia ayrozai*, *Lutzomyia davisi* and *Lu. sp.* of Venezuela, all of them in very low proportion.

In station 2, there were found in low proportion: *Lu. triacantha*, *Lu. migonei*, *Lu. sericea*, *Lu. ovallesi*, *Lu. sp.* of Venezuela, *Lu. flaviscutellata*, *Lu. nuneztovari*, *Lu. squamiventris* and *Lu. antunesi*.

All collected species were as follows: **1)** *Lutzomyia (Nyssomyia) richardwardi* (Ready & Fraiha, 1978) (66.6%); **2)** *Lutzomyia (Psychodopygus) chagasi* (Costa Lima, 1941) (20.2%); **3)** *Lutzomyia (Aragoi) runoides* (Fairchild & Hertig, 1953) (2.1 %); **4)** *Lutzomyia (Psychodopygus) ayrozai* (Barreto

& Coutinho, 1940) (1.4%); **5)** *Lutzomyia (Psychodopygus) davisi* (Root, 1934) (1.4%); **6)** *Brumptomyia* spp. (1.4%); **7)** *Lutzomyia (Pressatia) triacantha* (Mangabeira, 1942) (0.72%); **8)** *Lutzomyia (Migonei) migonei* (Franca, 1920) (0.72%); **9)** *Lutzomyia (Migonei) sericea* (Floch & Abonnecnc, 1944) (0.72%); **10)** *Lutzomyia (Verrucarum) ovallesi* (Ortiz, 1952) (0.72%); **11)** *Lu. sp.* de Venezuela (0.72%); **12)** *Lutzomyia (Nyssomyia) flaviscutellata* (Mangabeira, 1942) (0.72%); **13)** *Lutzomyia (Verrucarum) nuneztovari* (Ortiz, 1954) (0.72%); **14)** *Lutzomyia (Psychodopygus) squamiventris* (Lutz & Neiva, 1912) (0.72%); **15)** *Lutzomyia (Nyssomyia) antunesi* (Coutinho, 1939) (0.72%). There was a prevalence of *Lutzomyia richardwardi* which represented 66.6% (92 specimens) of collected phlebotomines (139 specimens) (Table No 1).

## DISCUSSION

This is the first inventory of phlebotomine fauna in the Forest Reserve of Imataca (Venezuelan Guyana) that permits an initial

Table 1. Number and percentage of sand flies capture in Imataca Forest Reserve. Bolivar State, December 1999.

Especies	Estacion 1		Estacion 2		Total	
	N	%	N	%	N	%
<i>Lu. richardwardi</i>	1	20	91	67,9	92	66,2
<i>Lu. chagasi</i>	-	-	28	20,9	28	20,1
<i>Lu. ayrozai</i>	2	40	-	-	2	1,4
<i>Lu. davisii</i>	2	40	-	-	2	1,4
<i>Lu. ovallesi</i>	-	-	2	1,5	2	1,4
<i>Lu. nuneztovari</i>	-	-	1	0,7	1	0,7
<i>Lu. triacantha</i>	-	-	1	0,7	1	0,7
<i>Lu. sp. de venezuela</i>	-	-	1	0,7	1	0,7
<i>Lu. squamiventris</i>	-	-	1	0,7	1	0,7
<i>Lu. antunesi</i>	-	-	1	0,7	1	0,7
<i>Lu. flaviscutellata</i>	-	-	1	0,7	1	0,7
<i>Lu. sericea</i>	-	-	1	0,7	1	0,7
<i>Lu. runoides</i>	-	-	3	2,2	3	2,2
<i>Lu. migonei</i>	-	-	1	0,7	1	0,7
<i>Brumptomyia</i> spp.	-	-	2	1,5	2	1,4
<b>Total</b>	<b>5</b>	<b>100</b>	<b>134</b>	<b>100</b>	<b>139</b>	<b>100</b>

(Estacion 1) Concesión CVG (8° 11' 14'' N - 61°44' 17''W)

(Estacion 2) Campamento La Montaña (06° 16' 16'' N - 61°19' 28''W)

approach to the composition of the phlebotomine fauna present in this location. Two species were registered in Venezuela for the first time, *Lutzomyia* (*Nyssomyia*) *richardwardi*, and *Lutzomyia* (*Aragaoi*) *runoides*, being *Lu. richardwardi* of great importance from an epidemiological point of view, considering that this specie has been associated with transmission of leishmaniasis, considering that protozoan of the genus *Leishmania* (*Viannia*) spp (CIPA, 1999) has been found in this specie of *Lutzomyia*. The present study suggests that due to the large number of females captured during the period of study (92 specimens, 66.6%) related to total number of captured individuals (139 specimens), *Lu. richardwardi* is the most abundant species in the sampled area.

Four species are recorded for the State of Bolivar for the first time: *Lutzomyia* (*Pressatia*) *triacantha*, *Lutzomyia* (*Verrucarum*) *nuneztovari*, *Lutzomyia* (*Psychodopygus*)

*chagasi* and *Lutzomyia* (*Migonei*) *migonei* (CIPA, 1999) (Felicangeli, 1988, 1991) (Felicangeli *et al.*, 1988).

Scarcity of species collected in the station 1, should be consequence of the partial alteration of the forest as it reveals a high degree of deforestation. It can be inferred that the species that were found have the ability to adapt themselves to such circumstances. Above mentioned *Lu. davisii* is characterized for being highly anthropophilic and this characteristic could be related with its presence in the more inhabited sampled place; on the contrary, *Lu. richardwardi* was found in both places, demonstrating ability to adapt to the intervened areas as well as to places without human interference.

Obtaining knowledge about association of phlebotomine fauna with intervened or in regeneration process areas and with non perturbed areas, should provide information to explain if there are indicator species in each ecosystem type, supplying data about the adaptation dynamics of these species and

therefore, about transmission of this parasitism in the diverse epidemiological cycles, in each studied ecosystem.

These results are similar to those obtained in the tropical forest study of San Roque, Antioquia, (Colombia) in which a wide variety of species were found:

*Lutzomyia (Nyssomyia) trapidoi*, *Lutzomyia (Psychodopygus) panamensis*, *Lutzomyia (Lutzomyia) gomezi*, *Lutzomyia (Nyssomyia) yuilli*, *Lutzomyia (Lutzomyia) lichyi*, *Lutzomyia (Helcocyrtomyia) hartmanni*, *Lutzomyia (Psathyromyia) shannoni*, among others (Vélez *et al.*, 1987).

In the case of Imataca, presence of vectors does not imply that the study zone become a focus of cutaneous or visceral leishmaniasis, but it does turn it in a risk zone, particularly taking into account that added to the deforestation processes, a new ecology is being generated and man is getting closer to natural spots of transmission as consequence of new and unorganized human settlements that become mining exploitation zones in the limits or into the woods in the Reserve.

Future research studies in this region must be aimed to develop a proposal of epidemiological research to determine

the contact of population with the vector and the distribution, behavior, relative density and seasonal variation of phlebotomine species of the zone in addition to the study of current and potential transmission reservoirs of the disease. Latter study is necessary to detect the extent of the contribution of wild mammals to maintain the endemic of the disease in the region. Such data should provide a background of major importance to establish links between ecology and preventive medicine.

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