Feeding Preference of the Sand Flies Lutzomyia umbratilis and L. spathotrichia (Diptera: Psychodidae, Phlebotominae) in an Urban Forest Patch in the City of Manaus, Amazonas, Brazil

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Precipitin tests were performed on blood meals of 199 sand flies (161 Lutzomyia umbratilis, 34 L. spathotrichia, two Lutzomyia of group shannoni, one L. anduzei) in a non-flooded upland forest on the Campus of the Universidade Federal do Amazonas. This is the second largest forest fragment in an urban setting in Brazil. Results on L. umbratilis, which is considered to be the principal leishmaniasis vector in this region, indicated rodents as its predominant blood source in contrast to previous reports in which blood meal analysis indicated that this species fed principally on Xenarthra (particularly sloths)

Key words: bloodmeal sources - precipitin test - Lutzomyia - Amazonas - Brazil

The purpose of the present study is to determine the blood meal sources of some of the phlebotomine sand fly species found in the forest remnants of the UFAM Campus. The Campus is located in the city of Manaus, state of Amazonas.

This Campus area, measuring nearly 800 ha and located at 03°04'34”S and 59°57'30”W, is considered to be one of the largest urban tropical sites (Carmo 2002) and Brazil’s second urban forest patch (Figure). Several mammal species such as, edentates (Bradypus tridactylus, Choloepus didactylus, Tamandua tetradactyla, Dasybus novemcinctus, Cyclopes didactylus), primates (Pithecia pithecia, Saimiri sciureus, Saginus bicolor bicolor), rodents (Sciurus sp., Dasyprocta agouti, D. fuliginosa, Myoprocta acouchy), and carnivorous such as Nasua nasua (Carmo 2002), inhabit this forest patch.

The landscape is comprised by plateaus, slopes and lowlands and is covered with upland non-flooded forest, grassland, campinarana, second growth and secondary forest in various succession levels (Nara & Cruz 1996, Ribeiro et al. 1999). The present study was conducted in upland non-flooded forest with varying degrees of environmental anthropophilic alterations. The collections were carried out in November and December 2002 from 8:00 to 10:00 a.m., by using the aspiration method at the tree base with a modified type CDC light trap on previously determined sites [areas with distinct anthropic alterations – sites P1,P2, P3 (less anthropic), P5, P6 (more anthropic)]. The phlebotomine specimens were hauled to the Inpa/AM laboratory, killed at 20°C in order to interrupt the digestive process and then kept at this same temperature up to the onset of the precipitin assays (microcapillary).

Identification was done according to Young and Duncan (1994) taxonomic key. Females were stocked into eppendorf tubes according to species and forwarded to
sent to the Fiocruz, RJ, for the precipitin test. The insects were individually ground in pH 7.0 saline solution and later centrifuged at 1800 rpm for 5 min and the eluate was examined through the in vitro reaction, by using bird and mammal anti-sera (Siqueira 1960, Lorosa et al. 1998). Blood-meal fully fed females were processed testing five antigens in the obtained eluate, using anti-sera from: human being (*Homo sapiens*), rodent (*Rattus rattus*), edentate (*Bradypus* sp.), canids (*Canis familiaris*), fowl (*Gallus gallus*) prepared in rabbits.

A total of 199 phlebotomine sand fly blood meals were tested (Table). Of this total 151 were from an environment with lower (sites: P1, P2, P3) and 48 from one with higher anthropophilic alteration (sites: P5, P6). In the environments thought to be of lower anthropic alteration it was found that 76.2% (115) were of species *L. umbratilis*, 21.9% (33) *L. spathotrichia*, 1.3% (2) *Lutzomyia* of group *shannoni*, 0.6% (1), and *L. anduzei*. In the higher anthropophilic environment 95.8% (46) were of the *L. umbratilis* and 4.2% (1) *L. spathotrichia*. The *L. umbratilis* was abundant in the tree base, and it could be noted that the predominant feeding source for this species at the areas with lower alteration was from rodents 34% (46), followed by canids 19% (26), edentate 18% (24), human beings 16% (22), fowl 13% (18). Similarly at the area with higher alteration, canids and rodents both prevailed with 29% (13) of positivity, followed by sloth 22% (10), and human being 20% (9). The digestive tract content in 10 specimens of *L. spathotrichia*, reacted with the edentate anti-sera (40%), rodent and fowl 1.5 of each (20%), 3 of human being (12%) and 2 of canids (8%). In the more altered environment only one content of the digestive tract reacted with human being anti-serum and one with fowl. One specimen of *L. anduzei* collected from site P2 reacted with edentate anti-serum and two digestive tract contents of *Lutzomyia* of the group *shannoni* reacted for rodent and canids. Multiple blood meals were noted in *L. umbratilis* (site P1 – human being/fowl, dog/fowl, human being/dog, sloth/fowl, P2 – dog/fowl, P3: dog/fowl and human being/fowl) and *L. spathotrichia* (P1 – sloth/fowl, dog/rodent, rodent/fowl).

The phlebotomine feeding habit together with other
being/fowl, dog/fowl, human being/dog and sloth/fowl, and *L. spathotrichia* on sloth/fowl, dog/rodent, and rodent/fowl. The undertaking of studies on the fauna of phlebotomine sand flies in areas where environmental changes have occurred it has become a subject of great interest on account of the great ability of many of these insect species to adapt themselves to any anthropophilic environment.

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**REFERENCES**


**TABLE**

Number of positive reactions to anti-sera for sand flies species in different environments at the Universidade Federal do Amazonas Campus

<table>
<thead>
<tr>
<th>Sand flies species</th>
<th>M</th>
<th>R</th>
<th>E</th>
<th>C</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Lutzomyia umbratilis</em></td>
<td>22/9</td>
<td>46/13</td>
<td>24/10</td>
<td>26/13</td>
<td>18/0</td>
</tr>
<tr>
<td><em>L. spathotrichia</em></td>
<td>3/1</td>
<td>5/0</td>
<td>10/0</td>
<td>2/0</td>
<td>5/1</td>
</tr>
<tr>
<td><em>L. anduzei</em></td>
<td>1/0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>L. group shannonii</em></td>
<td>1/0</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*a* anti-sera; M: man; R: rodent; E: edentate; C: canids; F: fowl