

Miranda¹

Marcos Miranda¹

Eunice A Bianchi Galati^{II}

Phlebotomine fauna in a rural area of the Brazilian Pantanal

Fauna flebotomínea de área rural do Pantanal sul-matogrossense, Brasil

ABSTRACT

The aim of the study was to identify among the phlebotomine fauna potential leishmaniasis vectors. The study was carried out in Corumbá county, State of Mato Grosso do Sul, Mid-West Brazil (18°59'S, 56°39'W). Sand fly captures were undertaken fortnightly with automatic light traps at 11 sites in forested environments and anthropic areas from April 2001 to July 2003. A total of only 41 specimens were captured. Thirty-one percent of the specimens were captured in forests and 68.3% in anthropic areas. The predominance of non-anthropophilic groups and the low density of *N. whitmani*, a known cutaneous leishmaniasis vector, does not seem to indicate any actual risk of the transmission of this disease in the study area.

KEYWORDS: Phlebotominae. Psychodidae. Insect vectors. Ecology vectors. Rural population.

RESUMO

O estudo teve como objetivo identificar a fauna flebotomínea em busca de vetores de leishmanioses. As capturas de flebotomíneos foram realizadas em uma fazenda (18°59'S, 56°39'W) localizada cerca de 150 km da cidade de Corumbá, Mato Grosso do Sul, com armadilhas automáticas luminosas, instaladas em 11 pontos distribuídos em áreas florestais e antrópicas, quinzenalmente, de abril 2001 a julho de 2003. Apenas 41 espécimes de flebotomíneos foram capturados. Nos ambientes florestais foram capturados 31,7% dos espécimes e no antrópico, 68,3%. A predominância de flebotomíneos não antropofílicos e a ínfima densidade de *N. whitmani*, reconhecidamente vetor de leishmaniose tegumentar, parece não indicar real risco de transmissão desta doença, na área.

DESCRIPTORIOS: Phlebotominae. Psychodidae. Insetos vetores. Ecologia de vetores. População rural.

¹ Empresa Brasileira de Pesquisa Agropecuária. Corumbá, MS, Brasil

^{II} Departamento de Epidemiologia. Faculdade de Saúde Pública. Universidade de São Paulo. São Paulo, SP, Brasil

Correspondence:

Eunice A. B. Galati
Departamento de Epidemiologia
Av. Dr. Arnaldo, 715
01246-904 São Paulo, SP, Brasil
E-mail: egalati@usp.br

INTRODUCTION

Among the diseases transmitted by phlebotomines, leishmaniasis call for special attention due to the severity of some of their forms and the large world population (350 millions) living in areas of risk, with 1.5 million new cases of cutaneous leishmaniasis and 500,000 new cases of visceral leishmaniasis occurring annually. Brazil is included among the five countries worldwide with the highest incidence.*

The neighboring cities of Corumbá and Ladário, in the Pantanal region of the state of Mato Grosso do Sul, Mid-West Brazil, constitute an important focus of visceral leishmaniasis.³ The urban phlebotomine fauna of Corumbá was studied over a period of about three years from 1984 to 1986, when it was suspected that *Lutzomyia cruzi* and perhaps also *Lutzomyia forattinii* might be vectors of the disease.¹ However, natural infection was observed³ only in *L. cruzi* by *Leishmania chagasi*, the agent of American visceral leishmaniasis.

Though the urban sand fly fauna of the respective counties has been investigated, no information as to the rural fauna of this same region within the Pantanal ecosystem has been published.

This lack of knowledge regarding the rural phlebotomine fauna of an area close to an important urban focus of visceral leishmaniasis and the urban center itself are both great tourist attractions, together with the fact that two of this study's authors were living on the Nhumirim ranch provided both the motivation and opportunity for the ecological study of this insect group in a region usually considered too remote for the necessary sampling.

Eleven sites, in both natural and anthropic environments, on the Nhumirim ranch were sampled between April 2001 and July 2003 with the aim of investigating the presence of potential vectors of leishmaniasis.

METHODS

The Nhecolândia Pantanal region is characterized by a mosaic of lakes, interspersed among areas of different types of vegetation, the most important being grassland, covering 44.2% of the area (part of which may be seasonally inundated), forested savannah or "cerradão" (33.5%), savannah (20.2%) and semi-deciduous forest (1.1%).⁴ The areas covered by forest and savannah vegetation form patches situated on slightly elevated ground (1-2 m above the level of

the grassland) called "cordilheiras", not normally subject to flooding.⁴

The Nhumirim ranch (18°59'S, 56°39'W) is an experimental station of the Empresa Brasileira de Pesquisa Agropecuária (Embrapa - Pantanal) with an area of about 4,390.6 ha, 150 km from Corumbá city.

The regional climate is tropical, with pluviometric indexes varying between 800 and 1,400 mm/year, there being a clear division into a rainy season (November to March), when 80% of the annual rainfall occurs, and a dry season (April to October).⁴ The mean annual temperature is 25.5°C, the mean annual maximum temperature 31.5°C and the mean annual minimum 20.3°C. The respective absolute temperatures are above 40°C and close to 0°C.

The captures were undertaken fortnightly from April 2001 to July 2003, with automatic light traps, during the period between 6:00 p.m. and 6:00 a.m. The sites of capture, the altitudes of which vary between 100 and 135 m above sea level, were situated: 1) at an automatic meteorological station in the middle of a deciduous forest (18°59'087S, 56°38'215W; 135 m a.s.l.); 2) within the biological reserve - forested savannah (18°58'603S, 56°37'614W; 115 m a.s.l.); 3) on the edge of the biological reserve (18°58'786S, 56°37'289W; 108 m a.s.l.); 4) in a new orchard (18°59'320S, 56°37'217W; 100 m a.s.l.); 5) in domicile A, veranda (18°59'288S, 56°37'155W; 106 m a.s.l.); 6) in a chicken house (18°59'302S, 56°37'146W; 105 m a.s.l.); 7) in domicile B, veranda (18°59'525S, 56°37'097W; 101 m); 8) within an old orchard (18°59'567S, 56°37'076W; 106 m a.s.l.); 9) on the edge of the old orchard (18°59'632S, 56°36'852W; 104 m a.s.l.); 10) in a pigsty (18°59'642S, 56°37'095W; 105 m a.s.l) and 11) in the winter pasture I, a forested savannah area of 156.8 ha used for cattle research (18°59'785S, 56°37'400W; 101 m a.s.l).

The species nomenclature follows Galati² (2003). A sample of the material has been deposited in the entomological collection of the Faculdade de Saúde Pública of the Universidade de São Paulo.

RESULTS AND DISCUSSION

Despite the large number of traps installed during the 28 months of the project which yielded a total of 616 samples, only 41 specimens were captured. These belonged to the following seven species: *Brumptomyia avellari*, *Evandromyia (Aldamyia) aldafalcaoae*, *Evandromyia (Aldamyia) lenti*,

*WHO. The leishmaniasis and *Leishmania*/HIV co-infection. Geographic distribution. <http://www.who.int/mediacentre/factsheets/fs116/en> [2004 sep 30]

Table - Number of phlebotomines captured on the Nhumirim ranch by species, sex and ecotype. Brazil, 2001-2003.

Ecotypes	Species		<i>B. avellari</i>		<i>E. (A.) aldafalcaoae</i>		<i>E. (A.) lenti</i>		<i>N. whitmani</i>		<i>P. (F.) aragaoi</i>		<i>P. (P.) shannoni</i>		<i>S. sordellii</i>		Total Both sexes %
	Sex	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀		
1. Meteorol. station	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	2.4
2. Ecological Reserve	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	2.4
3. Ecological Reserve-edge	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	2	2.4
4. New orchard	-	5	-	4	1	-	1	-	-	1	-	-	-	-	-	10	29.4
5. Domicile A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6. Chicken house	-	-	-	-	-	1	-	-	-	-	-	-	1	-	2	4.9	
7. Domicile B	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	2.4
8. Old orchard	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	2.4	
9. Old orchard-edge	1	2	1	2	-	2	-	-	1	-	1	-	-	3	7	24.4	
10. Pigsty	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	4.9	
11. Winter pasture I	3	-	-	-	1	6	-	-	-	-	-	-	-	4	6	24.4	
Total %		4 9.7	9 22.0	1 2.5	8 19.5	2 4.9	10 24.4	1 2.4	-	1 2.5	1 2.4	-	1 2.4	2 4.9	10 24.4	31 75.6	100.0
Total (Both sexes) %		13 31.7		9 22.0		12 29.3		1 2.4		2 4.9		1 2.4		3 7.3		41 100.0	

A.: *Aldomyia*; B.: *Brumptomyia*; E.: *Evandromyia*; F.: *Forattiniella*; N.: *Nyssomyia*; P.: *Psathyromyia*; S.: *Sciopemyia*

Nyssomyia whitmani, *Psathyromyia (Forattiniella) aragaoi*, *Psathyromyia (Psathyromyia) shannoni* and *Sciopemyia sordellii* (Table).

In the three forested environments a total of 13 specimens (31.7%) were captured and in the anthropic ones 28 specimens (68.3%). Of the specimens taken in these latter, 21 (75.0%) were captured in the orchards, including one male of *N. whitmani*, a known vector of cutaneous leishmaniasis in many Brazilian areas. In only one of the domiciles was a female of *E. aldafalcaoae* captured.

Overall, *B. avellari* predominated (31.7%), followed by *E. lenti* (29.3%) and *E. aldafalcaoae* (22.0%). The other species were captured still less frequently.

The environment represented by the orchards was the only one in which all the species mentioned (56.2% of the specimens) were captured.

The winter pasture I (forested savannah) was the environment in which 24.4% of the specimens were captured, but in this case they belonged to only two species (*B. avellari* and *E. lenti*). In the other environments only a few insects belonging to one or two species were captured.

Of the fauna captured in this study all species, except for *S. sordellii*, which predominated in a cave and also occurred in several peridomiciliary environments¹ of Corumbá, and *E. aldafalcaoae*, described from two males captured in an area of the Pantanal, had previously been captured in areas of Mato Grosso do Sul not belonging to the Pantanal. The fauna captured on the Nhumirim ranch, apart from its extremely low density as compared with that of Corumbá,^{2,3} also differs in composition. Thus, neither of the two predominant urban peridomiciliary species of Corumbá and Ladário, *L. cruzi* and *L. forattinii*, was captured on the Nhumirim ranch. The seasonal flooding that occurs on the Nhumirim farm may create unfavorable conditions for the breeding of these sand flies, whereas Corumbá and Ladário cities are located in a drier area, with rocky outcrops where phlebotomines may breed underneath or between the rocks. Hence the study on the Nhumirim ranch seems to indicate the absence of any risk of the transmission of this disease on this farm and perhaps in other areas of the Pantanal plain with similar environmental characteristics.

Although one male of *N. whitmani* was captured in the old orchard situated close to domiciliary areas its very low density seems to exclude the risk of transmission of cutaneous leishmaniasis in the studied area.

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