Notes on the Sand Fly Fauna (Diptera:Psychodidae) in the State of Rio Grande do Sul, Brazil

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The authors report the catching of 13 different species at the Aparados da Serra National Park and at the Turvo State Park in the municipalities of Cambará do Sul and Tenente Portela, respectively, both in the State of Rio Grande do Sul, where those species were practically unknown.

Key words: geographical distribution - sand fly - fauna - Phlebotominae - Brazil

Proceeding with the study of taxonomy and geographical distribution of American phlebotomine sand flies, a trip was made to the Aparados da Serra National Park and to the Turvo State Park (State of Rio Grande do Sul, Brazil) between 23 January and 4 February 1986. Both parks comprise areas of primitive forest and very little is known about the phlebotomine fauna in this region. Only two reports were published, more than 50 years ago, by R di Primio (1932, 1937) describing the finding of three different species of sand flies: *Lutzomyia fischeri* (Osório and São José do Norte municipalities), *L. intermedia* (Torres and São José do Norte municipalities) and *L. migonei* (São José do Norte). Recently, Young and Ducan (1994) published a guide concerning the identification and geographical distribution of the genera *Lutzomyia* in Mexico, West Indies and Central and South Americas, but very little was available about the phlebotomine fauna in Rio Grande do Sul. Thus, we decided to acomplish some captures to contribute to the knowledge of the sand fly fauna of this southern Brazilian state.

MATERIALS AND METHODS

Our study was developed in two municipalities located in the northern of Rio Grande do Sul, Cambará do Sul and Tenente Portela, near the State of Santa Catarina. Two areas were chosen to catch the specimens: (1) The Aparados da Serra National Park is located in Cambará do Sul and comprises 13,000 ha of the total area, it is formed by grey-yellowish cannyons, with up to 720 m of depth. Its vegetation is composed mainly by "araucarias" (native Brazilian pine) reaching up to 50 m of height. (2) The Turvo State Park is located in the extrem northeast of Rio Grande do Sul, on the left bank of Rio Uruguay, in the District of Derrubadas (municipality of Tenente Portela). The Park spraeds on 17,691 ha. It is the only remaining vestige of the subtropical rainy forest of the state. It spreads along side Rio Uruguay for an extension of 42 km toward Argentina in the north. In the east, south and west, its 80 km of extension are surrounded by rural properties where the soybean monoculture substitutes the primitive vegetation.

Appropriate methods for phlebotomine capture were employed (Barretto & Coutinho 1940, Sherlock & Pessoa 1964). Two different traps, based on luminous bait, were used: Chaniotis (Chaniotis & Anderson 1968) and Falcão (Falcão 1981). The Damasceno trap (Damasceno 1955) was used for capture in natural habitats, such as tree trunks and wild animal burrows. Additionally, manual captures were made with the aid of a Castro aspirator in humans and in natural habitats of wild animals, after disturbing the sand flies hiding-places with faggots or cigarette smoke. All material were captured by ES Dias and JE Silva.

The captured specimens were packed into hemolysis glass tubes containing commercial alcohol. Cotton compresses were finally introduced into the tubes for specimen protection during transportation. All the material was mounted on glass slides, using Canada balsam for the males and Berlese liquid for the females, and later examined in the laboratory.

The sand flies were identified through specific description, taxonomic keys, comparison with species of the standard collection and micrometry data.

This work was supported by CNPq/FIOCRUZ.
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Received 13 September 1996
Accepted 6 January 1997

The classifications adopted in this work were that proposed by Martins et al. (1978) and Young and Duncan (1994).

RESULTS AND REMARKS

In Cambará do Sul, despite careful investigation, only one specimen (female) of sand fly was captured: *L. monticola.* Meanwhile, in Tenente Portela the results were more significant, with 990 males and females specimens captured, distributed among 13 different species as shown in Table I.

Additionally, some captures were performed in São João do Sul, State of Santa Catarina. Fourty specimens of *L. fischeri*, a specie previously pointed out in that state by Martins et al. *(*1961), were captured.

Among the species captured, *Brumptomyia cunhai, B. nitzulescui, L. alphabetica, L. borgmeieri, L. correalimai, L. lanei, L. misionensis, L. monticola* were recorded for the first time in Rio Grande do Sul.

As far as we know, there is no record of human leishmaniases in Rio Grande do Sul. However, we verified the presence of two anthropophilic species, previously described as being involved in the transmission of *Leishmania braziliensis* in other Brazilian states: *L. intermedia* and *L. migonei* (Johnson et al. 1963, Forattini et al. 1972, Killick-Kendrick 1990).

As can be seen in Table II, *L. intermedia* was the species with higher frequency (361 specimens), performing 36.5% of the total number of specimens captured, mainly in wild animals burrows. This species presents a wide geographical distribution over Brazil, Paraguai and Argentina (Martins et al. 1978) and has been frequently described as being involved in the transmission of leishmaniases in the Brazilian states of São Paulo (Deane & Grimaldi 1985, Gomes et al. 1986), Rio de Janeiro (Rangel et al. 1984, 1986, 1990) and Espírito Santo (Falqueto 1995). *L. intermedia* was the species collected more frequently using human baits.

The second species in frequency was *L. fischeri*, captured mainly in rest places as tree trunks and tree hollows and inside the forest; the third was *L. migonei*, captured mainly with luminous baits inside the forest. Females of *L. migonei* infected by promastigotes in foci of *Le. braziliensis* have been described by Deane and Grimaldi (1985) and Lainson and Shaw (1987).

TABLE I

Distribution of the phlebotomine sand fly fauna in two localities of the State of Rio Grande do Sul, Brazil (January-February 1986)

Species	Males	Females	Total	Percentage
B. cunhai (Mangabeira, 1942)	2	0	2	0.2
B. nitzulescui (Costa Lima, 1932)	21	3	24	2.4
L. alphabetica (Fonseca,1936)	0	2	2	0.2
L. borgmeieri Martins, Falcão & Silva, 1972	24	11	35	3.5
L. correialimai Martins, Coutinho & Luz, 1970	1	1	2	0.2
L. fischeri (Pinto, 1926)	90	158	248	25.1
L. intermedia (Lutz & Neiva, 1912)	171	190	361	36.5
L. lanei (Barretto & Coutinho, 1941)	26	52	78	7.9
L. migonei (França, 1920)	65	23	88	8.9
L. misionensis (Castro, 1959)	9	15	24	2.4
L. monticola (Costa Lima, 1932)	3	36	39	3.9
L. pessoai (Coutinho & Barretto, 1940)	36	32	68	6.9
L. shannoni (Dyar,1929)	6	4	10	1.0
*L. (Nyssomyia)*sp.	0	3	3	0.3
*L. (Pintomyia)*sp.	0	6	6	0.6
Total	454	536	990	100

All the specimens listed were captured in the municipality of Tenente Portela, the State of Rio Grande do Sul, with two exceptions: *L. fisheri* - 36 males and 4 females captured in the municipality of São João do Sul, State of Santa Catarina; *L. monticola* - 1 female captured in the municipality of Cambará do Sul, State of Rio Grande do Sul. *B: Brumptomyia - L: Lutzomyia*

TABLE II

Number of specimens of sand fly captured with different traps in distinct biotypes

Species	Type of trap												Manual captures					
	Damasceno				Chaniotis				Falcão									
	A		B		C		D		C		D		D		E		F	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
B. cunhai	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
B. nitzulescui	3	1	-	-	-	-	1	-	-	-	-	-	17	2	-	-	-	-
L. alphabetica	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
L. borgmeieri	20	11	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. correalimai	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
L. fischeri	87	45	25	17	14	89	-	-	-	7	-	-	-	1	-	3	-	-
L. intermedia	34	14	-	-	-	-	101	149	-	-	-	-	1	1	-	13	35	13
L. lanei	4	2	1	-	-	3	21	46	-	-	-	1	-	-	-	-	-	-
L migonei	9	5	-	-	52	13	-	1	2	2	-	-	-	-	-	-	2	2
L. misionensis	-	5	-	3	9	4	-	-	-	2	-	-	-	-	-	1	-	-
L. monticola	3	3	-	-	-	29	-	-	-	3	-	-	-	-	-	1	-	-
L. pessoai	2	1	1	5	13	8	20	17	-	-	-	-	-	-	-	-	-	1
L. shannoni	3	-	1	-	-	3	-	-	-	1	-	-	-	-	-	-	2	-
L.(Nyssomyia) sp.	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
L.(Pyntomyia) sp.	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A to F refer to places of collection: A: around tree trunks, B: inside tree hallows, C: inside the forest, D: inside wild animals burrows, E: human bait, F: inside domestic animals houses; *B: Brumptomyia; L: Lutzomyia.*

REFERENCES

Barretto MP, Coutinho JO 1940. Processos de captura, transporte, dissecção e montagem de flebótomos. *An Fac Med Univ São Paulo 16*: 173-187.

Chaniotis BN, Anderson JR 1968. Age structure, population dynamics and vector potential of *Phlebotomus* in northern California. *J Med Entom 5*: 273-292.

Damasceno RMG 1955. Contribuição entomológica - Descrição de um método de captura de insetos em troncos de árvores, buracos na terra e tocas de animais silvestres, p.13. Congresso Brasileiro de Higiene, Belém.

Deane LM, Grimaldi G 1985. Leishmaniasis in Brazil. p. 247-281. In KP Chang, RS Bray (eds), *Leishmaniasis*, Elsevier, Amsterdam.

Falcão AR 1981. Um novo modelo de armadilha luminosa de sucção para pequenos insetos. *Mem Inst Oswaldo Cruz 76*: 303-305.

Falqueto A 1995. *Especificidade alimentar de flebotomíneos em duas áreas endêmicas de leishmanioses tegumentar no Estado do Espírito Santo*. Thesis. Fundação Oswaldo Cruz, Rio de Janeiro, 84 pp.

Forattini OP, Pattoli DBG, Rabello EX, Ferreira AO 1972. Infecção natural de flebotomíneos em foco enzoótico de leishmaniose tegumentar no Estado de São Paulo, Brasil. *Rev Saúde Públ São Paulo 6*: 431-433.

Gomes AC, Santos JLF, Galati EAB 1986. Ecological aspects of American cutaneous leishmaniasis. 4. Observations on the endophilic behavior of the sandfly and the vectorial role of *Psychodopygus intermedius* in the Ribeira Valley region of the São Paulo State, Brazil. *Rev Saúde Públ São Paulo 20*: 280-287.

Johnson PT, MacConnell E, Hertig M 1963. Natural infections of leptomonas flagellates in Panamanian *Phlebotomus* sandflies. *Exp Parasit 14*: 107-122.

Killick-Kendrick R 1990. Phlebotomine vectors of the leishmaniases: a review. *Med Vet Ent 4*: 1-24.

Lainson R, Shaw JJ 1987. Evolution, classification and geographical distrubution, p. 1-120. In W Peters, R Killick-Kendrick (eds), *The Leishmaniases in Biology and Medicine*, Vol. 1, Academic Press, London.

Martins AV, Leite de Godoy Jr T, Silva JE 1961. Nota sobre os flebótomos dos Estados do Paraná e Santa Catarina, com a redescrição da *Lutzomyia gaminarai* (Cordeiro, Vogelsang & Cossio, 1928) (Diptera, Psychodidae). *Rev Bras Biol 21*: 209-316.

Martins AV, Williams P, Falcão AL 1978. *American Sand Flies. (Diptera: Psychodidae, Phlebotominae)*. Rio de Janeiro, Acad. Brasil. Ciên., 195 pp.

Primio R di 1932. Sobre a presença do *Phlebotomus fischeri* Pinto, 1926, no Rio Grande do Sul. *Rev Cursos Fac Med Porto Alegre 18*: 141-149.

Primio R di 1937. Os flebótomos do litoral do Rio Grande do Sul. *Arq Zool Estado de São Paulo 5*: 177-242.

Rangel EF, Azevedo ACR, Andrade CA, Souza NA, Wermelinger ED 1990. Studies on sandfly fauna (Diptera: Psychodidae) in a focus of cutaneous leishmaniasis in Mesquita, Rio de Janeiro State, Brazil. *Mem Inst Oswaldo Cruz 85*: 39-45.

Rangel EF, Souza NA, Wermelinger ED, Barbosa AF 1984. Infecção natural de *Lutzomyia intermedia* (Lutz & Neiva, 1912) em área endêmica de leishmaniose tegumentar no Rio de Janeiro. *Mem Inst Oswaldo Cruz 79*: 395-396.

Rangel EF, Souza NA, Wermelinger ED, Azevedo ACR, Barbosa AF, Andrade CA 1986. Flebótomos de Vargem Grande, foco de leishmaniose tegumentar no Estado do Rio de Janeiro. *Mem Inst Oswaldo Cruz 81*: 347-349.

Shannon RC 1939. Methods for collecting and feeding mosquitoes in jungle yellow fever studies. *Am J Trop Med 19*: 131-140.

Sherlock IA, Pessoa SB 1964. Métodos práticos para captura de flebótomos. *Rev Bras Biol 24*: 331-340.

Young DG, Duncan MA 1994. Guide to the identification and geographic distribution of *Lutzomyia* sand flies in Mexico, the West Indies, Central and South America (Diptera: Psychodidae). *Mem Amer Ent Inst 54*: 1-881.