List of species in the genus *Lutzomyia*, França, 1924 (Psychodidae, Phlebotominae) from the State of Mato Grosso

Lista das espécies do gênero *Lutzomyia*, França, 1924 (Psychodidae, Phlebotominae) do Estado de Mato Grosso

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ABSTRACT

This work had the objective of listing the sand fly species that occur in the State of Mato Grosso, Brazil. Data relating to entomological surveys conducted between 1996 and 2004 were obtained from the National Health Foundation and the State Health Department, and this was supplemented with information from research carried out in the state and from the specialized literature. There were records of 106 sand fly species belonging to the genus Lutzomyia. This is a rich and diversified fauna, with some species restricted to forested areas and others recorded throughout the state, independent of the vegetation type, and in areas modified by human action, with predominance of Lutzomyia whitmani.

Key-words: Lutzomyia. *Sand fly fauna. Mato Grosso.*

RESUMO

O presente trabalho teve como objetivo listar as espécies de flebotomíneos que ocorrem no Estado de Mato Grosso, Brasil. Os dados foram obtidos junto à Fundação Nacional de Saúde e à Secretaria Estadual de Saúde, referente às pesquisas entomológicas desenvolvidas entre 1996 e 2004, complementadas com informações de pesquisas desenvolvidas no Estado e bibliografia especializada. Foram registradas 106 espécies de flebotomíneos pertencentes ao gênero Lutzomyia. Esta é uma rica e diversificada fauna, com algumas espécies restritas a áreas florestais e outras registradas em todo o Estado, independente da formação vegetal e em áreas modificadas pela ação antrópica, com predominância de Lutzomyia whitmani.

Palavras-chaves: Lutzomyia. *Fauna de flebotomíneos. Mato Grosso.*

Among the entomological research carried out in the State of Mato Grosso, Aguiar and Medeiros[1] presented a list of sand flies; De Luca et al[5] studied the distribution of sand flies in Alta Floresta, in the northern region of the state; Costa et al[4] and Rodrigues et al[13] developed entomological domestication studies in the mid-northern and mid-southern regions; Ribeiro and Missawa[12] described the spatial distribution of sand flies in the state, with emphasis on the species related to leishmaniasis transmission; Azevedo et al[2] identified 26 sand fly species in Peixoto de Azevedo, in the northern region of the state; Moura[9] developed an epidemiological survey on canine leishmaniasis in Cuiabá; Ribeiro et al[11] carried out a study on leishmaniasis vectors in the area influenced by the Manso power station; Ribeiro and Missawa[11 12] investigated the occurrence of *Lutzomyia* longipalpis in the city of Várzea Grande; and Cipa[3] dealt with the state as a whole.

Studies on the geographic regions where sand flies occur contribute towards better comprehension of the epidemiological aspects of leishmaniasis. The present study had the objective of listing the sand flies species that occur in the State of Mato Grosso.

MATERIAL AND METHODS

The State of Mato Grosso is situated in the central-western region of Brazil, with an area of 903,358 square kilometers, and it has 2,803,274 inhabitants[7]. Mato Grosso forms the watershed between the Plate and Amazon Basins, the two biggest hydrographic basins on the continent and it contains three of the most important Brazilian vegetation zones: the Amazon forest, the savanna and the Pantanal marshland. The annual rainfall distribution shows the tropical character of the area, with two well-defined seasons: one dry and the other wet[7].

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Mato Grosso is considered to be the biggest agricultural expansion frontier in Brazil. Over the last few years it has defined the process of internal development in Brazil. The occupation of economic space, in terms of both the migrants becoming established as smallholders in settlement projects and the big agricultural and pastoral companies, has consolidated the position of Mato Grosso as the Agricultural State[7].

The present study consists of a report on species of the genus *Lutzomyia* that occur in the State of Mato Grosso. The data were mainly obtained from the National Health Foundation's Regional Coordination Office for Mato Grosso (FUNASA/CORE/MT) and from the Entomology Laboratory of the Vector and Anthropozoonosis Surveillance Directorate, Environmental Health Surveillance Coordination Office, Health Surveillance Superintendency, State Health Department (SES/MT). These data related to an entomological survey that was developed between 1996 and 2004, as identified by Young and Duncan[15], and were supplemented with information from studies carried out in the state and from the specialized literature.

RESULTS

The research that was carried out recorded 106 sand fly species belonging to the genus Lutzomyia. These were distributed in the following subgenera: *Evandromyia* (5), *Lutzomyia* (12), *Micropygomyia* (2), *Nyssomyia* (11), *Pintomyia* (3), *Pressatia* (3), *Psathyromyia* (8), *Psychodopygus* (15), *Sciopemyia* (3), *Trichophoromyia* (6), *Trichopygomyia* (3) *and Viannamyia* (2)*; and in the groups: Aragaoi* (6), *Baityi* (1), *Dreisbachi* (2), *Migonei* (12), *Oswaldoi* (6), *Saulensis* (2) *and Verrucarum* (2)*;* plus two species without a defined group, as shown in Table 1.

The entomological survey carried out by FUNASA and SES/MT listed, among other species: *L. amazonensis, L. andersoni, L. auraensis, L. brisolai, L. chagasi, L. choti, L. christenseni, L. clitella, L. corumbaensis, L. cruciata, L. dasymera, L. dreisbachi, L. dubitans, L. dysponeta, L. fischeri, L. goiana, L. hirsuta nicaraguensis, L. howardi, L. inflata, L. intermedia, L. longispina, L. microps, L. olmeca bicolor, L. ruii, L. servulolimai* and *L. termitophila.*

Aguiar and Medeiros[1] published a list of sand flies from the central-western region consisting of 98 species, among which: *L. baityi, L. bispinosa, L. coutinhoi, L. damascenoi, L. evangelistai, L. falcata, L. flabellata, L. geniculata, L. gomezi, L. guyanensis, L. lichyi, L. marinkellei, L. oliveirai, L. pusilla, L. richardwardi* and *L. sherlocki*.

Azevedo *et al*[2] identified *L. spathotrichia* and others in the state, and Moura[9] observed *L. olmeca nociva* in Cuiabá.

In the present study, all the species listed in Table 1 were observed in the Amazon forest area, except for *L. brisolai, L. corumbaensis, L. dasymera* and *L. dysponeta*.

The species that occurred in the forest area were: *L. baityi, L. bispinosa, L. campbelli, L. coutinhoi, L. damascenoi, L. evangelistai, L. falcata, L. flabellata, L. geniculata, L. gomezi, L. guyanensis, L. hirsuta hirsuta, L. hirsuta nicaraguensis, L. lichyi, L. marinkellei, L. monstruosa, L. octavioi, L. oliveirai, L. pusilla, L. richardwardi, L. sherlocki* and *L. spathotrichia.*

The species that were observed in the Amazon forest, transition area, savanna and Pantanal were: *L. acanthopharynx, L. amazonensis, L. andersoni, L. antunesi, L. aragaoi, L. auraensis, L. carmelinoi, L. christenseni, L. cruzi, L. davisi, L. dendrophyla, L. dubitans, L. evandroi, L. flaviscutellata, L. goiana, L. hermanlenti, L. lenti, L. longipalpis, L. longipennis, L. longispina, L. lutziana, L. migonei, L. nevesi, L. punctigeniculata, L. quinquefer, L. runoides, L. sallesi, L. saulensis, L. scaffi, L. shannoni, L. sordellii, L. teratodes, L. termitophila, L. walkeri* and *L. whitmani.*

DISCUSSION

The great diversity of sand fly fauna observed in Mato Grosso must be due to the presence of different types of vegetation, with areas of Amazon forest in the northern region of the state, savanna in the central and mid-southern regions, and vast transition areas between forest, savanna and marshland in the southern extremity of the state.

Aguiar and Medeiros[1] argued that although species like *L. cortelezzii, L. missionensis, L. monticola* and *L. pessoai* occurred in the central-western region of Brazil, they were not found in Mato Grosso. They also highlighted the absence of *L. microps* from the region. *Lutzomyia ubiquitalis* was demonstrated in the state, in forest, transition and savanna area. This species was described as having a regional distribution in the Brazilian Amazon region according to these authors. *Lutzomyia runoides* was captured in different types of vegetation in the state, thus decreasing the discontinuity between the State of Rondônia and the southeastern region of the country, where it was recorded and classified as having discontinuous distribution.

Among the endemic species in the northern region[1], the following have been captured in Mato Grosso: *L. auraensis, L. begonae, L. chagasi, L. dasymera, L. dreisbachi, L. dubitans, L. inflata, L. llanosmartinsi, L. olmeca bicolor, L. paraensis, L. ruii, L. servulolimai, L. shawi, L. spathotrichia* and *L. wilsoni.*

The species listed in Mato Grosso that have been implicated as or suspected of being capable of transmitting *Leishmania* to humans and animals in Brazil are: *L. ayrozai, L. flaviscutellata, L. longipalpis, L. paraensis, L. ubiquitalis, L. whitmani*[1 8 15], *L. anduzei, L. antunesi, L. umbratilis*[1 15], *L. cruzi, L. intermedia*[1 8], *L. carrerai carrerai, L complexa, L. yuilli yuilli*[8], *L. gomezi, L. migonei, L. olmeca bicolor, L. olmeca nociva* and *L. tuberculata*[1].

The local fauna was partially described by Ribeiro and Missawa[12], who observed 88 sand fly species. The diversity is characterized by an overlapping of vector fauna and probably of the etiological agents for leishmaniasis, with the respective reservoirs in neighboring states, since Mato Grosso is situated in the central-western region of Brazil. Thus, connections with the northern, northeastern, southeastern and southern regions of the country are established, and these connections have great epidemiological importance.

Table 1 - Species in the Genus* Lutzomyia *from the State of Mato Grosso, Brazil.

Genus	Subgenus	Groups	Species
Lutzomyia França, 1924	*Evandromyia* Mangabeira, 1941		*L. begonae* (Ortiz & Torres, 1975), *L. bourrouli* (Barretto & Coutinho, 1941), *L. infraspinosa* (Mangabeira, 1941), *L. monstruosa* (Floch & Abonnenc, 1944), *L. teratodes* Martins, Falcão & Silva, 1964
	Lutzomyia França, 1924		*L. cruciata* (Coquillett, 1907), *L. cruzi* (Mangabeira, 1938), *L. dispar* Martins & Silva, 1963, *L. evangelistai* Martins & Fraiha, 1971, *L. falcata* Young, Morales & Ferro, 1994, *L. flabellata* Martins & Silva, 1964, *L. gomezi* (Nitzulescu, 1931), *L. lichyi* (Floch & Abonnenc, 1950), *L. longipalpis* (Lutz & Neiva, 1912), *L. marinkellei* Young, 1979, *L. sherlocki* Martins, Silva & Falcão, 1971, *L. spathotrichia* Martins, Falcão & Silva, 1963
	Micropygomyia Barretto, 1462		*L. micropyga* (Mangabeira, 1942), *L. oliveirai* Martins, Silva & Falcão, 1970
	Nyssomyia Barretto, 1462		*L. anduzei* (Rozeboom, 1942), *L. antunesi* (Coutinho, 1939), *L. flaviscutellata* (Mangabeira, 1942), *L. intermedia* (Lutz & Neiva, 1912), *L. olmeca bicolor* Fairchild & Theodor, 1971, *L. olmeca nociva* Young & Arias, 1982, *L. richardwardi* Ready & Fraiha, 1981, *L. shawi* Fraiha, Ward & Ready, 1981, *L. umbratilis* Ward & Fraiha, 1977, *L. whitmani* (Antunes & Coutinho, 1939), *L. yuilli yuilli* Young & Porter, 1972
	Pintomyia Costa Lima, 1932		*L. christenseni* Young & Duncan, 1994, *L. damascenoi* (Mangabeira, 1941), *L. fischeri* (Pinto, 1926)
	Pressatia Mangabeira, 1942		*L. choti* (Floch & Abonnenc, 1941), *L. dysponeta* (Fairchild & Hertig, 1952), *L. triancantha* (Mangabeira, 1942)
	Psathyromyia Barretto, 1962		*L. abonnenci* (Floch & Chassignet, 1947), *L. campbelli* (Damasceno, Causey & Arouck, 1945), *L. dendrophyla* (Mangabeira, 1942), *L. dasymera* (Fairchild & Hertig, 1961), *L. lutziana* (Costa Lima, 1932), *L. punctigeniculata* (Floch & Abonnenc, 1944), *L. scaffi* (Damasceno & Arouck, 1956), *L. shannoni* (Dyar, 1929)
	Psychodopygus Mangabeira, 1941		*L. amazonensis* (Root, 1934), *L. ayrozai* (Barretto & Coutinho, 1940), *L. bispinosa* (Fairchild & Hertig, 1951), *L. carrerai carrerai* (Barretto, 1946), *L. chagasi* (Costa Lima, 1941), *L. claustrei* Abonnenc, Léger & Fauran, 1979, *L. complexa* (Mangabeira, 1941), *L. davisi* (Root, 1934), *L. geniculata* (Mangabeira, 1941), *L. guyanensis* (Floch & Abonnenc, 1941), *L. hirsuta hirsuta* (Mangabeira, 1942), *L. hirsuta nicaraguensis* (Fairchild & Hertig, 1961), *L. lainsoni* (Fraiha & Ward, 1974), *L. llanosmartinsi* (Fraiha & Ward, 1980), *L. paraensis* (Costa Lima, 1941)
	Sciopemyia Barretto, 1962		*L. microps* (Mangabeira, 1942), *L. servulolimai* (Damasceno & Causey, 1945), *L. sordellii* (Shannon & Del Ponte, 1927)
	Trichophoromyia Barretto, 1962		*L. auraensis* (Mangabeira, 1942), *L. clitella* Young & Pérez, 1994, *L. howardi* Young, 1979, *L. octavioi* (Vargas, 1949), *L. ruii* Arias & Young, 1982, *L. ubiquitalis* (Mangabeira, 1942)
	Trichopygomyia Barreto, 1962		*L. dasypodogeton* (Castro, 1939), *L. longispina* (Mangabeira, 1942), *L. rondonensis* Martins, Falcão & Silva, 1965
	Viannamyia Mangabeira, 1941		*L. furcata* (Mangabeira, 1941), *L. tuberculata* (Mangabeira, 1941)
		Aragaoi (Theodor, 1965)	*L. aragaoi* (Costa Lima, 1932), *L. barrettoi barrettoi* (Mangabeira, 1942), *L. brasiliensis* (Costa Lima, 1932), *L. coutinhoi* (Mangabeira, 1942), *L. inflata* (Floch & Abonnenc, 1944), *L. runoides* (Fairchild & Hertig, 1953)
		Baityi Theodor, 1965	*L. baityi* (Damasceno, Causey & Arouck, 1945)
		Dreisbachi (Lewis et al, 1977)	*L. dreisbachi* (Causey & Damasceno, 1945), *L. hermanlenti* Martins, Silva & Falcão, 1970
		Migonei Theodor, 1965	*L. andersoni* Le Pont & Desjeux, 1988, *L. baculus* Martins, Falcão & Silva, *L. carmelinoi* Ryan, Fraiha, Lainson & Shaw, 1986, *L. corumbaensis* Galati, Nunes, Oshiro & Rego, 1989, *L. dubitans* (Sherlock, 1962), *L. evandroi* (Costa Lima & Antunes, 1936), *L. lenti* (Mangabeira, 1938), *L. migonei* (França, 1920), *L. sallesi* (Galvão & Coutinho, 1939), *L. sericea* (Floch & Abonnenc, 1944), *L. termitophila* Martins, Falcão & Silva, 1964, *L. walkeri* (Newstead, 1914)
		Oswaldoi (Theodor, 1965)	*L. goiana* Martins, Falcão & Silva, 1962, *L. longipennis* (Barretto, 1946), *L. peresi* (Mangabeira, 1942), *L. pusilla* Dias, Martins, Falcão & Silva, 1986, *L. quinquefer* (Dyar, 1929), *L. trinidadensis* (Newstead, 1922)
		Saulensis (Lewis et al, 1977)	*L. saulensis* (Floch & Abonnenc, 1944), *L. wilsoni* (Damasceno & Causey, 1945)
		Verrucarum Theodor, 1965	*L. nevesi* (Damasceno & Arouck, 1956), *L. serrana* (Damasceno & Arouck, 1949)
		*	*L. acanthopharynx* Martins, Falcão & Silva, 1962, *L. brisolai* Le Pont & Desjeux, 1987

* species without a defined group

This is a rich and diversified fauna, with some species restricted to the forested areas, while others are recorded all over the state, independent of the vegetation zone, and in areas modified by human action.

The visceral leishmaniasis vector, *L. longipalpis*, is a very eclectic species in relation to its dietary habits, with high ecological valence. It can therefore adapt to environments with diverse characteristics and inhabit ecosystems going from hostile dry regions to areas modified by human action[6], and from coastal regions to exposed locations[10]. *L. cruzi*, which has been implicated as vector for *Leishmania chagasi* in Mato Grosso do Sul[8,14], with widespread distribution across the state.

The species *L. whitmani*, which presents widespread uniform distribution in the state and has been recorded both within and around homes, is probably the best-adapted species[12,13]. *L. antunesi* is prevalent in the forest canopy[2]. *L. migonei* is found in wetter areas[6] and is a species found in all five regions of Brazil[1]. It has been observed in Mato Grosso, in areas with all types of vegetation. *L. flaviscutellata* has been recorded in these same areas and, although it is considered extremely wild, it has moved into areas around and inside homes, thus indicating differentiated behavior, as observed by Rebêlo et al[10].

Lutzomyia intermedia is considered to be the most important vector for cutaneous leishmaniasis in southeastern Brazil and it occurs in the states neighboring Mato Grosso, such as Tocantins, Goiás, Federal District and Mato Grosso do Sul[1]. *L. ayrozai* is predominantly found in areas around homes and in areas adjacent to forests[6]. It occurs in all of the vegetation types in Mato Grosso, excepted in the marshland.

According to Aguiar and Medeiros[1], *L. carrerai carrerai* and *L. yuilli yuilli* occurs in all of the Brazilian regions, except for the southern region, while *L. anduzei* is found in the northern, northeastern and central-western regions. These species present distribution in all the vegetation types, with exception of marshland. *L. gomezi* has the same occurrence as *L. anduzei* and has been observed exclusively in forest areas, while *L. tuberculata* is in forest and savanna.

The species *L. complexa, L. olmeca bicolor, L. olmeca nociva, L. ubiquitalis* and *L. umbratilis* are important vectors in the Amazon region, occurring in forest, transition and savanna areas, except for *L. olmeca nociva*, which has only been observed in the savanna.

We can communicate that this is the first record of *L. clitella* in Brazil, and the specimen is stored at the International Phlebotomine Reference Center at the René Rachou Research Center, Fundação Oswaldo Cruz, in Belo Horizonte City, Brazil.

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