PUBLIC HEALTH

Contribution to the Knowledge of the Phlebotomine Sand Flies Fauna (Diptera: Psychodidae) of Timóteo Municipality, Minas Gerais, Brazil

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Contribuição para o Conhecimento da Fauna de Flebotomíneos (Diptera: Psychodidae), do Município de Timóteo, MG

RESUMO - Foi realizada uma investigação sobre a fauna de flebotomíneos no município de Timóteo, MG, com a instalação de armadilhas do tipo New Jersey, em sete bairros, entre dezembro de 2005 e janeiro de 2006. O total de 2.289 espécimes de flebotomíneos foi registrado. *Nyssomyia whitmani* (Antunes & Coutinho) (48,1%), *Nyssomyia intermedia* (Lutz & Neiva) (36,8%) e *Micropygomyia quinquefer* (Dyar) (7,1%) foram as espécies mais abundantes. Algumas espécies de flebotomíneos incriminadas como transmissoras de *Leishmania* em Minas Gerais foram registradas e a importância destas para saúde pública é destacada. Neste trabalho faz-se o primeiro registro de *Pintomyia bianchigalatiae* (Andrade Filho, Aguiar, Dias & Falcão), *Micropygomyia capixaba* (Dias, Falcão, Silva & Martins), *Micropygomyia schreiberi* (Martins, Falcão & Silva) e *Psathyromyia pascalei* (Coutinho & Barretto) para Timóteo. *Pressatia choti* (Floch & Abonnenc) é registrada pela primeira vez para Minas Gerais.

PALAVRAS-CHAVE: Flebotomíneo, leishmaniose, saúde pública, Phlebotominae, *Pressatia choti*

ABSTRACT - An investigation of the phlebotomine sandfly fauna in the municipality of Timóteo, Minas Gerais State, Brazil, was undertaken with New Jersey traps placed in seven neighborhoods from December 2005 to January 2006. A total of 2,289 phlebotomine sandfly specimens were recorded. *Nyssomyia whitmani* (Antunes & Coutinho) (48.1%), *Nyssomyia intermedia* (Lutz & Neiva) (36.8%) and *Micropygomyia quinquefer* (Dyar) (7.1%) were the most abundant species sampled. Some sandfly species that play a role in the transmission of *Leishmania* Ross in the State of Minas Gerais were recorded and their importance to public health is highlighted. *Pintomyia bianchigalatiae* (Andrade Filho, Aguiar, Dias & Falcão), *Micropygomyia capixaba* (Dias, Falcão, Silva & Martins), *Micropygomyia schreiberi* (Martins, Falcão & Silva) and *Psathyromyia pascalei* (Coutinho & Barretto) are recorded for the first time in the municipality of Timóteo, and *Pressatia choti* (Floch & Abonnenc) is recorded for the first time in the State of Minas Gerais.

KEY WORDS: Sandfly, Leishmaniasis, Phlebotominae, *Pressatia choti*, public health

The identification of sandfly species and their geographical distribution are of great importance due to the facts that: 1) they vector a disease and 2) the dissemination of the disease has increased significantly over the past few decades. The constant alterations in the natural environment, caused mainly by the growing urbanization, have created new endemic sites surrounded by non-forested regions (Carvalho *et al* 2006).

Research into sandflies is normally concerned with the probable location of infection or the identification of the vectors involved. So far, some 229 phlebotomine species have been recorded in Brazil, 31% of them having been reported in the State of Minas Gerais (Aguiar & Medeiros 2003). Studies in Southeastern Brazil demonstrated that the transmission of *Leishmania* is highly dependent on certain sandfly species, particularly *Nyssomyia intermedia* (Lutz & Neiva) and *Nyssomyia whitmani* (Antunes & Coutinho) (Mayrink *et al* 1979, Peterson & Shaw 2003).

Andrade Filho *et al* (1997) undertook a study of the

local phlebotomine fauna in the municipality of Timóteo, Minas Gerais State. No other entomological survey of the sandfly species of that municipality has since been carried out, the records being restricted to the species reported by these authors.The municipality of Timóteo is an American cutaneous leishmaniasis (ACL) endemic area, although no visceral leishmaniasis (VL) has ever been reported, but a large number of ACL cases (88) were registered by the Secretaria Municipal de Saúde of Timóteo from 2002 to 2007 (SMS 2007).

The aim of this study is to provide new information on the sandfly fauna of Timóteo, MG.

Material and Methods

This study was undertaken in the municipality of Timóteo (19°30`36``S - 42°38`16``W), located in Vale do Aço region, with 76,092 inhabitants (IBGE, 2007), of which 99.8% live in the urban area. The municipality is located in the eastern part of Minas Gerais State, and has an area of 145,159 km². The mean annual temperature is 24°C, with a tropical, humid climate, and typical Atlantic forest vegetation which constitutes part of one of the biggest conservation areas of Brazil, the Parque Estadual do Rio Doce. Timóteo is bordered by the municipalities of Coronel Fabriciano, Ipatinga, Marliéria, Antônio Dias and Jaguaraçú (Fig 1).

The phlebotomines were collected using New Jersey light traps during 30 successive nights from December 2005 to January 2006. The traps were set from 6:00 P.M. to 6:00 A.M. in peridomiciliary areas in seven neighborhoods of the municipality: Alvorada, Cachoeira do Vale, Funcionários, Macuco, Primavera, Recanto Verde and São José (Fig 1). All these neighborhoods are urban and in the places where traps were installed no animal shelter was observed. The specimens collected were fixed in 70% ethanol, separated by sex for each neighborhood and mounted in Berlese solution on microscope slides. The classification of the phlebotomines follows that proposed by Galati (2003).

Samples were analyzed by area, sex and species using the non-parametric tests of Mann-Whitney and Kruskal-Wallis. The *BioEstat* statistics program 4.0 (AnalystSoft, Version, 2005) was used for the analyses (Ayres *et al* 2004).

Results and Discussion

The total of 2,289 phlebotomine sandflies of the subtribes Brumptomyiina, Lutzomyiina, Sergentomyiina and Psychodopygina were recorded (Table 1). Only eight specimens (0.35%) were not identified to the species level and some were not identified even to the generic level and were thus excluded from the analyses.

Nineteen species of sandfly were collected in Timóteo (Table 1). The higher densities were observed for *N. whitmani* (48.1%), *N. intermedia* (36.8%) and *Micropygomyia quinquefer* (Dyar) (7.1%), respectively, as previously recorded by Andrade Filho *et al* (1997). There has been no change in the abundance of the main species recorded in the municipality over these 10 years. No significant difference between the numbers of *N. whitmani* and *N. intermedia* (Kruskal-Wallis, $P > 0.05$) captured was observed although there is a difference between *N. whitmani* and *M. quinquefer* (Kruskal-Wallis, $P > 0.05$) (Fig 2).

Some sandflies responsible for the transmission of *Leishmania* species in Brazil, e.g. *N. intermedia*, *N. neivai* (Pinto), *Migonemyia migonei* (França), *N. whitmani*, *Pintomyia fischeri* (Pinto), *P. pessoai* (Coutinho & Barretto), *Psychodopygus ayrozai* (Barretto & Coutinho) and *Bichromomyia flaviscutellata* (Mangabeira), have been recorded in the State of Minas Gerais (Aguiar & Medeiros 2003, Andrade Filho *et al* 2007, Loiola *et al* 2007). Although some other species have been incriminated as suspect vectors of visceral leishmaniasis (Santos *et. al* 1998), only *Lutzomyia longipalpis* (Lutz & Neiva) was recorded in Minas Gerais (Souza *et al* 2004, Monteiro

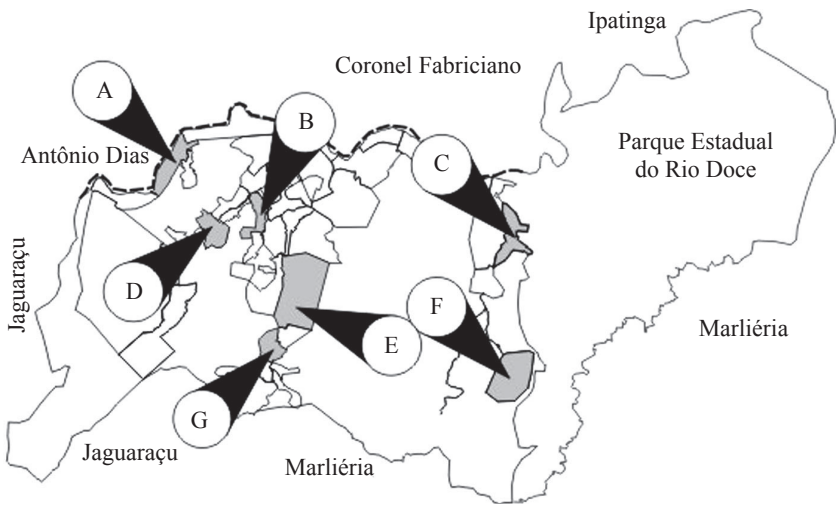

Fig 1 Map of Timóteo where the phlebotomine sandfly species were captured: A - Cachoeira do Vale; B - Funcionários; C - Recanto Verde; D - Alvorada; E - Primavera; F - Macuco; G - São José.

Table 1 Phlebotomine sandfly species of the Timóteo municipality, State of Minas Gerais, Brazil (December 2005 and January 2006). M = male; F = female; SR = sex ratio (M/F).

Species	Neighborhoods																						
	Alvorada		SR	Cachoeira do Vale		SR	Funcionários		SR	Macuco		SR	Primavera		SR	Recanto Verde		SR	São José		SR	Total	%
	M	F		M	F		M	F		M	F		M	F		M	F		M	F			
Brumptomyia sp.	0	0	-	0	0	-	0	0	-	0	0	-	0	1	1.00	0	0	-	0	0	-	1	< 0,1
Nyssomyia whitmani	104	116	1.12	12	10	0.83	44	116	2.64	27	26	0.96	157	234	1.49	35	25	0.71	56	139	2.48	1,101	48,1
Nyssomyia intermedia	7	6	0.86	11	7	0.64	49	60	1.22	268	120	0.45	100	81	0.81	68	45	0.66	8	13	1.63	843	36,8
Micropygomyia quinquefer	12	4	0.33	4	1	0.25	7	4	0.57	21	0	0	67	27	0.40	6	1	0.17	7	1	0.14	162	7,1
Pintomyia pessoai	5	15	3.00	0	0	-	0	3	3.00	2	0	0	5	11	2.20	0	0	-	4	12	3.00	57	2,5
Evandromyia sallesi	0	0	-	1	0	0	3	0	0	6	2	0.33	4	3	0.75	0	0	-	2	8	4.00	29	1,3
Evandromyia lenti	3	4	1.33	1	1	1.00	1	0	0	0	0	-	3	9	3.00	1	3	3.00	2	0	0	28	1,2
Pintomyia fischeri	4	0	0	0	0	-	1	0	0	3	0	0	9	2	0.22	2	1	0.50	3	2	0.67	27	1,2
*Pintomyia bianchigalatiae**	2	0	0	1	0	0	0	0	-	1	0	0	3	0	0	0	0	-	1	0	0	8	0,4
Lutzomyia longipalpis	0	0	-	2	0	0	0	0	-	0	0	-	4	1	0.25	0	0	-	0	0	-	7	0,3
Evandromyia termitophila	1	1	1.00	0	0	-	0	0	-	0	0	-	2	0	0	1	0	0	0	0	-	5	0,2
*Micropygomyia schreiberi**	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	3	3.00	3	0,1
*Micropygomyia capixaba**	0	0	-	0	0	-	0	0	-	0	0	-	2	0	0	2	0	0	0	0	-	4	0,2
Micropygomyia borgimeieri	0	0	-	0	0	-	1	0	0	0	0	-	0	0	-	0	0	-	3	0	0	4	0,2
*Pressatia choti***	0	0	-	0	0	-	0	0	-	1	2	2.00	0	0	-	0	0	-	0	0	-	3	0,1
Psychodopygus davisi	0	0	-	0	0	-	0	0	-	0	1	1	1	0	0	0	0	-	0	0	-	2	0,1
Psathyromyia aragaoi	0	0	-	0	0	-	0	0	-	0	0	-	1	1	1.00	0	0	-	0	0	-	2	0,1
Sciopemyia sordellii	0	0	-	0	0	-	0	0	-	0	0	-	1	0	0	1	0	0	0	0	-	2	0,1
*Psathyromyia pascalei**	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	1	1.00	0	0	-	1	< 0,1
Total	138	146	1.06	32	19	0.59	106	183	1.73	329	151	0.46	359	370	1.03	116	76	0.66	86	178	2.07	2,289	100,00

* First record to Timóteo municipality;
** First record to the State of Minas Gerais.

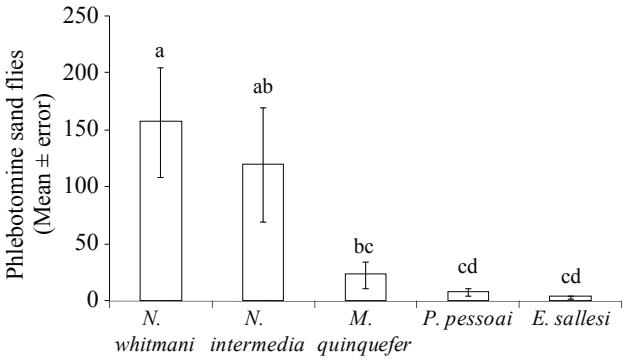

Fig 2 Frequency of the most abundant species of phlebotomine sandflies captured in Timóteo, January 2005 and December 2006 (Significant difference is represented for distinct letter).

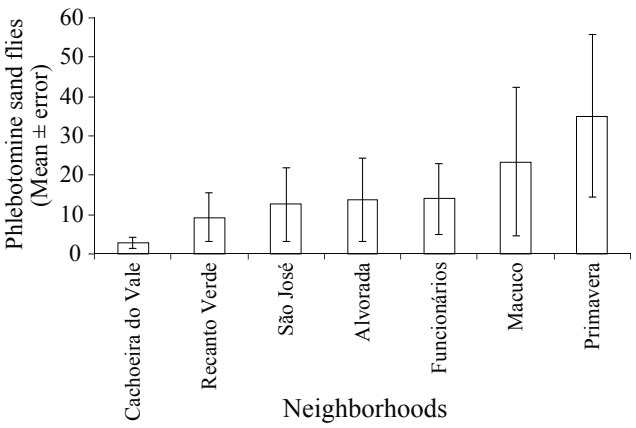

Fig 3 Sandfly species recorded in each neighborhood of Timóteo, December 2005 and January 2006 (non-significant, Kruskal-Wallis, $P > 0.05$).

et al 2005, Resende *et al* 2006). *Nyssomyia whitmani* and *N. intermedia* are considered to be the main vectors of *Leishmania* (*Viannia*) *braziliensis* (Lainson 1989), and both species are widespread (Peterson & Shaw 2003, Andrade Filho *et al* 2007). However, *N. intermedia* is capable of adapting readily to anthropic environments (Aguiar *et al* 1987). Both sandfly species were found sympatrically in Timóteo and could account for the transmission of cutaneous leishmaniasis in the urban area, as observed in other regions (Brazil *et al* 2006).

Some species (e.g. *oswaldoi* group) feed on reptiles (Young & Duncan 1994). Among them, *M. quinquefer* is found in tree trunks and roots, on rocks and in domestic animal shelters (e.g. chicken-run, pigsty) (Aguiar & Medeiros 2003). There is no record of any etiologic agent carried by *M. quinquefer* that may cause animal or human disease (Deane & Deane 1957, Galati *et al* 1996, Andrade Filho *et al* 1998).

The highest number and greatest diversity of sandflies were found in the Primavera neighborhood (Table 1). The trap was set 100 meters from a forested rivulet, where the soil is organically rich. The sandfly species might be present in this forested area and migrate to this neighborhood, thus being captured in the traps. However, in recent years, only four cases of ACL have been notified in this neighborhood (SMS 2007).

The captures of the phlebotomines near the Parque Estadual do Rio Doce were made in the Recanto Verde and Macuco neighborhoods. Curiously, these neighborhoods show a great abundance of sandfly species, and a higher number of males than females (Table 1). The higher number of sandflies captured in Macuco was probably due to the proximity of other residences where henhouses and dogs were observed. In Recanto Verde three cases of ACL were notified in 2003 and in Macuco 14 cases of the disease were recorded between 2002 and 2007 (SMS 2007).

There were no significant differences among the captures made in the seven neighborhoods (Kruskal-Wallis, $P > 0.05$) (Fig 3), nor was there any predominance of either gender (Mann-Whitney, $P > 0.05$) (Table 1).

Andrade Filho *et al* (1997), using the classifications proposed by Young & Duncan (1994) and Forattini (1973), recorded 18 sandfly species of *Lutzomyia* and two of *Brumptomyia* in Timóteo, over a period of eight months. Recently, Souza & Borges (2008) published the record of *L. longipalpis* in the municipality, but no human VL was notified (SMS 2007). However, the municipality is near other areas, such as Belo Horizonte, where VL is endemic (Margonari *et al* 2006). Seeing that the presence of the vector *L. longipalpis* has been confirmed near endemic areas of visceral leishmaniasis, more attention should be given to entomological surveillance.

The present study constitutes the first record of *P. bianchiagalatiae* (Andrade Filho, Aguiar, Dias & Falcão), *M. capixaba* (Dias, Falcão, Silva & Martins), *M. schreiberi* (Martins, Falcão & Silva) and *Psathyromyia pascalei* (Coutinho & Barretto) in Timóteo (Table 1). This is also the first record of *Pressatia choti* (Floch & Abonnenc) in the State of Minas Gerais (Martins *et al* 1978, Aguiar & Medeiros 2003, Galati 2003), although probably the single female of *Pressatia* collected by Andrade Filho *et al* (1997) did in fact belong to this species.

The total number of species recorded in Timóteo increases from 18 (Andrade Filho *et al* 1997) to 25, due to this present report. These data provide to Secretaria Municipal de Saúde with a new map of the distribution of the sandfly species which may constitute a public health threat.

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