

# The known geographical distribution of sand flies in the state of Rondonia, Brazil (Diptera: Psychodidae) (1)

Cecile B. Biancardi<sup>(2)</sup>, Jorge R. Arias<sup>(3)</sup>, Rui A. de Freitas<sup>(3)</sup>, Eloy G. Castellon<sup>(3)</sup>

## Abstract

This study expands the knowledge of phlebotomine sand fly distribution in the state of Rondonia, Brazil. New state and country records are registered, bringing the total of known sand fly species in Rondonia to 78.

## INTRODUCTION

The only sand flies from the State of Rondonia previously reported were those by Martins *et al.* (1965, 1978). Martins *et al.* (1965) cited 40 species from Rondonia, two being in the genus *Brumptomyia*, thirty-seven in the genus *Lutzomyia*, and one in the genus *Psychodopygus*. Of the thirty-seven *Lutzomyia*, *L. dubia* became synonymous with *L. odax*, and *L. abunaensis* became synonymous with *L. brasiliensis*. Martins *et al.* (1978) added two more species in the genus *Lutzomyia* to this list, bringing the total number of previously described species to 42.

In the present work we report a total of 62 species, 47 in the genus *Lutzomyia* and 15 in the genus *Psychodopygus*. Interestingly, Martins *et al.* (1965, 1978) reported 16 species which we did not collect, and we are now reporting 36 species which are newly recorded for Rondonia. The total number of species collected in Rondonia is now 78 (Table 1).

## MATERIALS AND METHODS

During *Leishmania* studies in the State of Rondonia, we set out to make a survey of the total sand fly population, as recommended by Killick-Kendrick and Ward (1981). In order to do this we utilized four basic capture techniques: Manbait capture, tree base captures, Malaise trap captures and CDC miniature light

trap captures. Sand flies were preserved in 70% ethyl alcohol, cleared in KOH, and mounted in Berlese solution. Some specimens that were not mounted were examined in phenol.

## RESULTS

During our two year capture program we took a total of 15,418 sand flies, of which 26,4% were males and 73,6% were females (Table 2).

Map 1. This detailed map of the State of Rondonia shows (in the form of numbers) the collecting areas from which sand flies are recorded, and this is shown on the respective distribution maps to follow. Area 1 — the Guajará Mirim area from which Martins *et al.* (1965, 1978) record many species. Even though we collected from this area, the results will be published elsewhere, as they are part of a comparative work done with Dr. Martins. Area 2 — a forest area, with much disturbance from man, approximately five kilometers from the west bank of the Madeira River opposite Porto Velho. Area 3 — the area that includes the first 40 kilometers east of Porto Velho along the BR-364 Highway. Area 4 — was considered separately as it is part of an area which will eventually be flooded by the construction of a hydroelectric dam in the near future. Area 5 — the city of Ariquemes. This is a forest area around the recently developed city of Ariquemes. Area 6 — the city of Ji-Paraná, formerly called Rondonia, an older, more established, community. Area 7 — the city of Vilhena, a center of colonization projects, and an ecotome between terra firme forest and "cerrado".

(1) — This research was partly financed by a Grant in Aid from the Rondonia Territorial Government and CNPq's INPA project 3057.

(2) — Universidade Federal de Mato Grosso, Cuiabá.

(3) — Instituto Nacional de Pesquisas da Amazônia, Manaus.

Genus *Brumptomyia*  
(Map 2)

The genus *Brumptomyia* is represented in the State of Rondonia by two species, *B. pentacantha* and *B. pintoii*, as reported by Martins *et al.* (1965) from the Guajar Mirim area. *B. pentacantha* is a broadly distributed species, ranging from Ecuador, Peru, Bolivia, and the Brazilian Amazon from Acre to Par. *B. pintoii* has been found from French Guyana to Argentina. In Brazil, this last species has been found

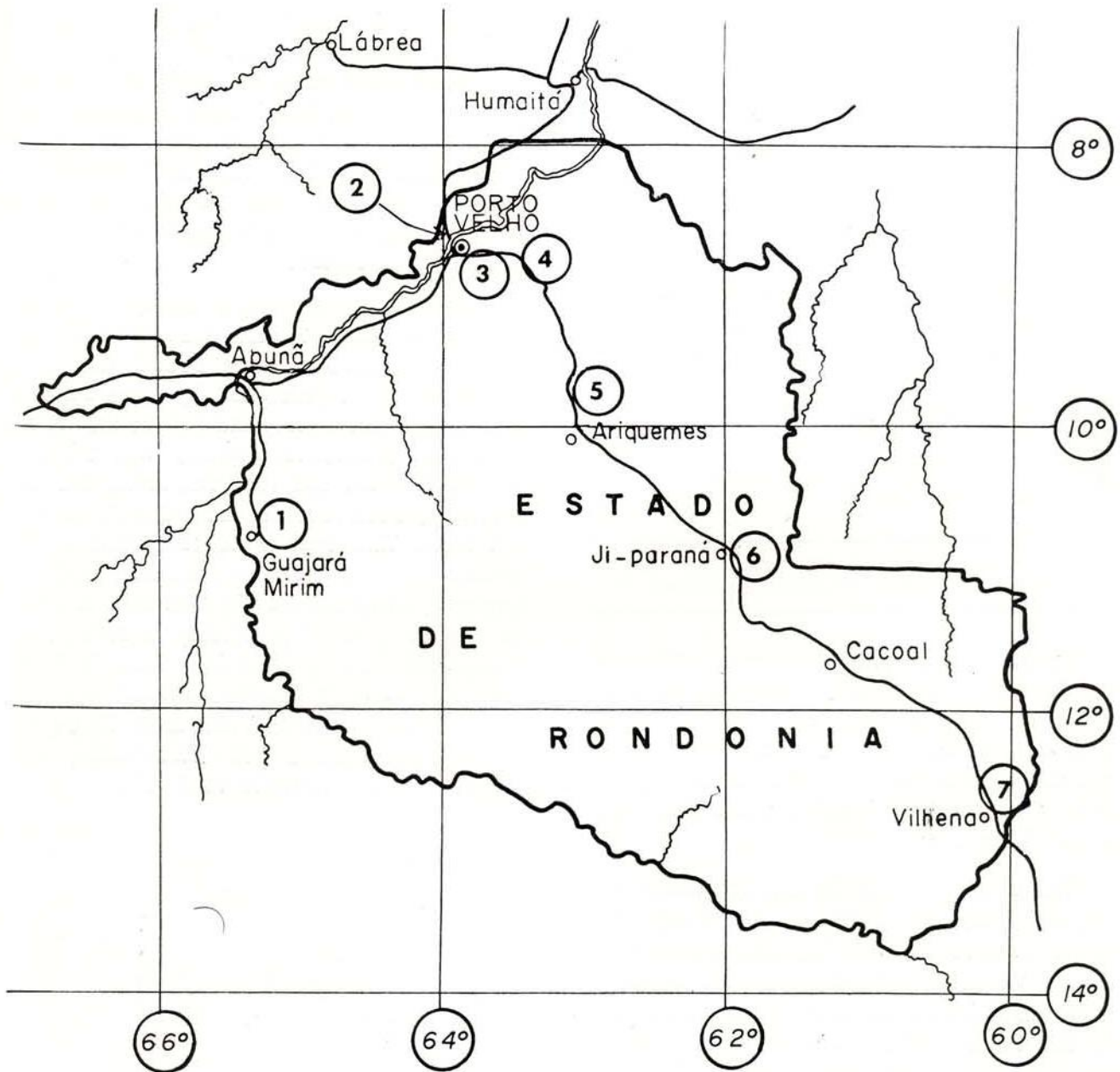
from Acre and Amazonas states south to So Paulo state. Our not recording further captures in this genus is probably due to differences in capture techniques used here as compared with those reported by Martins *et al.* (1965).

Genus *Lutzomyia*  
(Map 3)

In the genus *Lutzomyia*, subgenus *Lutzomyia*, the series *cruciata* is represented by three species. *L. gomezi*, is the species with the

TABLE 1 — Sand fly species found in the state of Rondonia, Brazil

<b>BRUMPTOMYIA</b> Frana & Parrot (1921)	<i>Lutzomyia pilosa</i> (Damasceno & Causey) (1944)
<i>Brumptomyia pentacantha</i> (Barretto) (1947)	<i>Lutzomyia richardwardi</i> (Ready & Fraiha) (1981)
<i>Brumptomyia pintoii</i> (Costa Lima) (1932)	<i>Lutzomyia rondoniensis</i> Martins, Falco & Silva (1965)
<b>LUTZOMYIA</b> Frana (1924)	<i>Lutzomyia rorotaensis</i> (Floch & Abonnenc) (1944)
<i>Lutzomyia abbonenci</i> (Floch & Chassignet) (1947)	<i>Lutzomyia runoides</i> (Fairchild & Hertig) (1953)
<i>Lutzomyia anduzei</i> (Rozeboom) (1942)	<i>Lutzomyia saulensis</i> (Floch & Abonnenc) (1944)
<i>Lutzomyia antunesi</i> (Coutinho) (1939)	<i>Lutzomyia scaffii</i> (Damasceno & Arouck) (1956)
<i>Lutzomyia aragai</i> (Costa Lima) (1932)	<i>Lutzomyia sericea</i> (Floch & Abonnenc) (1944)
<i>Lutzomyia auraensis</i> (Mangabeira) (1942)	<i>Lutzomyia serrana</i> (Damasceno & Arouck) (1949)
<i>Lutzomyia bacula</i> Martins, Falco & Silva (1965)	<i>Lutzomyia servulolimai</i> (Damasceno & Causey) (1945)
<i>Lutzomyia "begonae" like</i>	<i>Lutzomyia shannoni</i> (Dyar) (1929)
<i>Lutzomyia brasiliensis</i> (Costa Lima) (1932)	<i>Lutzomyia sherlocki</i> Martins, Silva & Falco (1971)
<i>Lutzomyia calcarata</i> Martins & Silva (1964)	<i>Lutzomyia spinosa</i> (Floch & Abonnenc) (1942)
<i>Lutzomyia caligata</i> Martins, Falco & Silva (1965)	<i>Lutzomyia termitophila</i> Martins, Falco & Silva (1964)
<i>Lutzomyia campbelli</i> (Damasceno, Causey & Arouck) (1945)	<i>Lutzomyia triacantha</i> (Mangabeira) (1942)
<i>Lutzomyia cerqueirai</i> (Causey & Damasceno) (1945)	<i>Lutzomyia trinidadensis</i> (Newstead) (1922)
<i>Lutzomyia coutinhoi</i> (Mangabeira) (1942)	<i>Lutzomyia tuberculata</i> (Mangabeira) (1941)
<i>Lutzomyia damascenoi</i> (Mangabeira) (1941)	<i>Lutzomyia ubiquitousalis</i> (Mangabeira) (1942)
<i>Lutzomyia dasymera</i> (Fairchild & Hertig) (1961)	<i>Lutzomyia umbratilis</i> Ward & Fraiha (1977)
<i>Lutzomyia dasipodogeton</i> (Castro) (1939)	<i>Lutzomyia walkeri</i> (Newstead) (1914)
<i>Lutzomyia dendrophila</i> (Mangabeira) (1942)	<i>Lutzomyia whitmani</i> (Antunes & Coutinho) (1939)
<i>Lutzomyia dreisbachi</i> (Causey & Damasceno) (1945)	<i>Lutzomyia wilsoni</i> (Damasceno & Causey) (1945)
<i>Lutzomyia evangelistai</i> Martins & Fraiha (1971)	<i>Lutzomyia yuilli</i> Young & Porter (1972)
<i>Lutzomyia flabellata</i> Martins & Silva (1964)	<i>Lutzomyia sp de Baduel</i> (Floch & Abonnenc) (1945)
<i>Lutzomyia flaviscutellata</i> (Mangabeira) (1942)	<b>PSYCHODOPYGUS</b> Mangabeira (1941)
<i>Lutzomyia flochi</i> (Abonnenc & Chassignet) (1948)	<i>Psychodopygus amazonensis</i> (Root) (1934)
<i>Lutzomyia furcata</i> (Mangabeira) (1941)	<i>Psychodopygus ayrozai</i> (Barretto & Coutinho) (1940)
<i>Lutzomyia gomezi</i> (Nitzulescu) (1930)	<i>Psychodopygus carrerai</i> (Barretto) (1946)
<i>Lutzomyia infraspinosa</i> (Mangabeira) (1941)	<i>Psychodopygus chagasi</i> (Costa Lima) (1941)
<i>Lutzomyia inornata</i> Martins, Falco & Silva (1965)	<i>Psychodopygus clautreii</i> (Abonnenc, Leger & Fauran) (1979)
<i>Lutzomyia longispina</i> (Mangabeira) (1942)	<i>Psychodopygus complexus</i> (Mangabeira) (1941)
<i>Lutzomyia loretonensis</i> (Llanos) (1965)	<i>Psychodopygus corcossoniensis</i> (LePont & Pajot) (1978)
<i>Lutzomyia lutziana</i> (Costa Lima) (1932)	<i>Psychodopygus davisii</i> (Root) (1934)
<i>Lutzomyia marinkellei</i> Young (1979)	<i>Psychodopygus guyanensis</i> (Floch & Abonnenc) (1941)
<i>Lutzomyia michopyga</i> (Mangabeira) (1942)	<i>Psychodopygus hirsutus</i> (Mangabeira) (1942)
<i>Lutzomyia monstrosa</i> (Floch & Abonnenc) (1944)	<i>Psychodopygus lainsoni</i> Fraiha & Ward (1974)
<i>Lutzomyia nevesi</i> (Damasceno & Arouck) (1956)	<i>Psychodopygus llanosmartinsi</i> Fraiha & Ward (1980)
<i>Lutzomyia nordestina</i> (Mangabeira) (1942)	<i>Psychodopygus paraensis</i> (Costa Lima) (1941)
<i>Lutzomyia "nordestina" like</i>	<i>Psychodopygus sp. 1</i> (Mangabeira) (1941)
<i>Lutzomyia octavioi</i> (Vargas) (1949)	<i>Psychodopygus sp. 2</i> (Mangabeira) (1941)
<i>Lutzomyia odax</i> (Fairchild & Hertig) (1961)	



Map. 1 — Detailed map of the state of Rondonia showing the various geographical localities and collecting sites.

greatest distribution of this group, having been found from Guajará Mirim and Porto Velho to Vilhena. Even though this (and other species) was not taken in Ariquemes and Ji-Parana, it was probably due to the limited collections in those areas. Outside of Rondonia, this species has an extensive distribution, ranging from El Salvador in Central America through the Amazon Basin in Brazil to Maranhão and Mato Grosso states. *L. sherlocki*, previously only reported from Peru and Mato Grosso state in

Brazil, was taken from the km 48 collection site to Ji-Parana. These collections were very limited in numbers. *L. marinkellei* WAS TAKEN ONLY ONCE, from the Vilhena collecting site. This species had only previously been reported from Colombia and Mato Grosso state in Brazil, this last collection site being close to Vilhena. *Lutzomyia evangelistai* is a species previously known from Peru and Para state, Brazil and was taken only from the Porto Velho and Km. 48 areas.



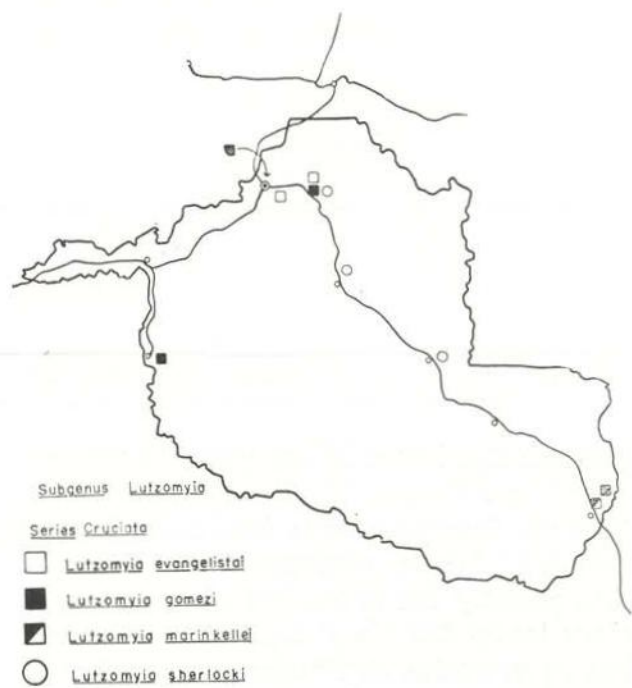
Map. 2 — Distribution of sand flies in the genus *Brumptomyia* from the state of Rondonia.

In the species group *gasparviannai* (Map 4), in the genus *Lutzomyia*, we only took *L. flabellata*. This species was collected from both ends of Rondonia, the Porto Velho area and the Vilhena area. Previous records place it only in the type locality, the neighboring state of Acre.

The *walkeri* series, in the species group *migonei* (Map, 5) of the genus *Lutzomyia*, is represented in the state by five species. *L. bacula*, which had previously been found in Rondonia and the state of Goiás was taken only in the Porto Velho area. Previous authors (Martins *et al.*, 1965, 1978; Young & Fairchild, 1974) did not place this species in the *walkeri* series. We believe, based on morphological characters, such as in the tips of the ejaculatory ducts, that it belongs in this group. *L. sericea*, previously recorded from French Guyana and the northern part of the Brazilian Amazon was taken in small numbers in the Vilhena area. *L. termitophila*, previously recorded from Rondonia, Minas Gerais and Mato Grosso states, *L. walkeri* from Peru, northern Brazil, Bolivia and Paraguay, and *L. sp.* of Baduel from Colombia, French Guyana and Rondonia were not taken by us, but were reported by Martins *et al.* (1965, 1978).

Both of the species in the *saulensis* group (Map. 6) were taken. *L. saulensis* and *L. wilsoni* were taken at all collecting sites, except *L. wilsoni* was not found in the Ariquememes area. *L. saulensis* is a widely occurring species, being found from Costa Rica to throughout the Amazon Valley. *L. wilsoni*, on the other hand, is more restricted in distribution to Amazonas and Rondonia states.

The series *verrucarum* of the species group *verrucarum* (Map. 7), and the series *serrana* of the same species group, both in the genus *Lutzomyia*, are represented by three species, one in the first series, and two in the latter. *L. nevesi* (series *verrucarum*) was taken in the Porto Velho and Ji-Parana areas and had previously been recorded from the Guajara-Mirim area. This species is restricted to the eastern part of Peru and Bolivia, and the western part of the Brazilian Amazon. *L. serrana* (series *serrana*) previously recorded from Guajara-Mirim, was taken from Porto Velho to Ji-Parana. *L. cdax* (series *serrana*) has only been taken in the Porto Velho area. These last two species have a wide distribution, from northern Central America to Brazil.



Map. 3 — Distribution of sand flies in the genus *Lutzomyia*, subgenus *Lutzomyia*, from the state of Rondonia.

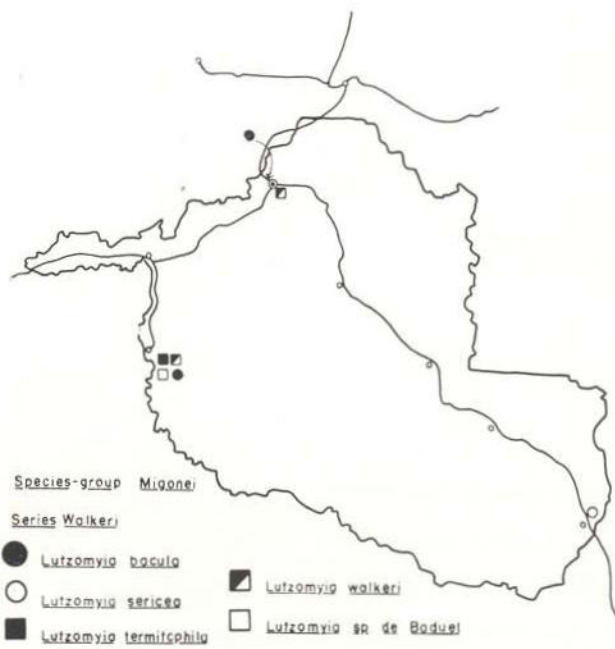
Two species of sand flies in the subgenus *Pintomyia* (Map. 8) are recorded from the Porto Velho and Vilhena extremes of Rondonia. *L. spinosa*, which has a broad distribution from Panama to the Brazilian Amazon, was taken more frequently than *L. damascenoi*, which has a known distribution from Colombia to the Brazilian Amazon.

Martins *et al.* (1978) recorded two species in the subgenus *Pressatia* (Map. 9) for the territory of Rondonia, both from the Guajara-Mirim area. We took three females, which we believe to be *L. triacantha*, from the Porto Velho and Ji-Parana areas. *L. calcarata* (the second species recorded by Martins *et al.*) is known from eastern Peru and Bolivia and the western Amazon of Brazil. *L. triacantha* has been recorded from central Colombia, eastern Peru, and the northern part of the Amazon Basin of Brazil.

Three species in the *infraspinosa* series and one in the *monstruosa* series of the subgenus *Evandromyia* (Map 10) are recorded for Rondonia. Martins *et al.* (1965, 1978) record *L. cerqueirai* from Guajara-Mirim and *L. infraspinosa* from the Porto Velho area. We didn't collect either of these species during the study, but we did find both sexes of a sand fly which



Map. 4 — Distribution of sand flies in the genus *Lutzomyia*, species-group *gasparviannai*, from the state of Rondonia.

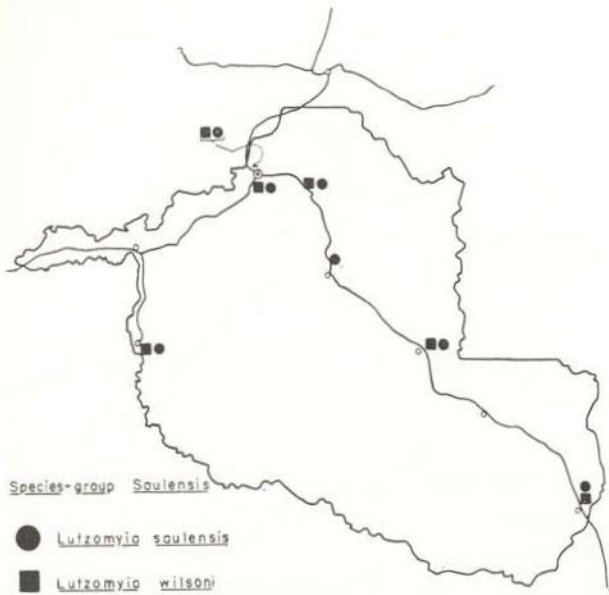


Map. 5 — Distribution of sand flies in the genus *Lutzomyia*, species-group *migonei*, from the state of Rondonia.

approximates *L. infraspinosa* and *L. begoniae*. We have decided to treat this species at a later date, and to avoid confusion with *L. infraspinosa* will call it *L. "begoniae-like"*. We have found this "begoniae-like" sand fly all the way up to the Manaus area in the state of Amazonas, Brazil. *L. cerqueirai* is an Amazonian species, while *L. infraspinosa* has been recorded from French Guyana, Suriname, and the Brazilian Amazon. In the *monstruosa* series of this subgenus, *L. monstruosa* has been found in Porto Velho and Guajara-Mirim in the state of Rondonia, its full known distribution being from French Guyana and most of the Brazilian Amazon Basin.

Both of the species in the subgenus *Viannomyia* (Map 11) which have been recorded for Rondonia, *L. furcata* and *L. tuberculata*, are widely distributed in the territory. Their known geographical distribution ranges from Central America to northern Brazil.

The *shannoni* group of sand flies (Map 12) is represented by seven species in Rondonia. *L. dendrophila* was the only species that was collected at all localities studied. *L. abbonenci*, *L. scaffi*, and *L. shannoni* were present everywhere except Vilhena (where we had limited

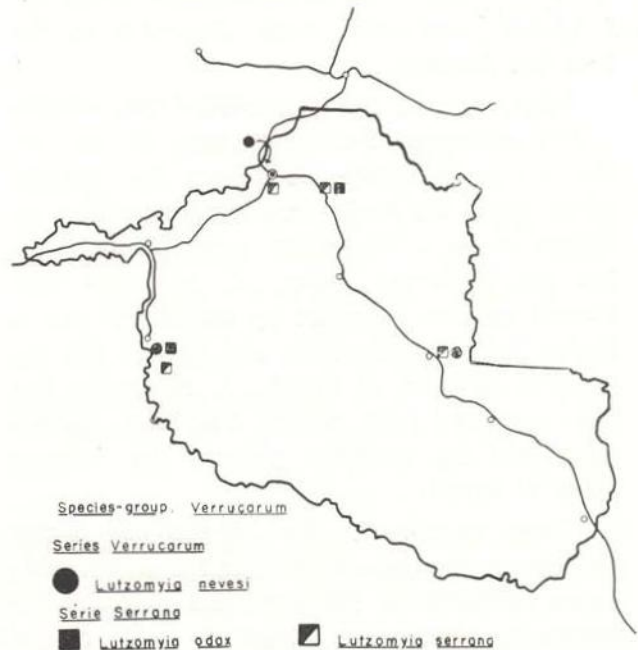


Map. 6 — Distribution of sand flies in the genus *Lutzomyia*, species-group *saulensis*, from the state of Rondonia.

collections). *L. campbelli*, *L. dasymera* and *L. lutziana* appear to be more restricted in their distribution in Rondonia, only having been taken in one or two collecting sites. Table 2 shows that there were over 1000 females in the "shannoni" group which were collected. These were not separated to species due to the difficulty of separating females of *L. abbonenci*, *L. dendrophila*, *L. scaffi*, and *L. shannoni*. The females of the other species in this group could be, and were separated. *L. shannoni* has one of the greatest ranges of distribution of New World species, having been recorded from the United States south to Argentina. *L. abbonenci* has a geographical distribution from Central America to Brazil; *L. dasymera* from Mexico to Colombia (this citation being a new country record); the other species in this group occur within the Amazon Basin of Brazil and some of the neighboring countries.

*Longispina* species group (Map 13) females are also indistinguishable and we have grouped all 247 specimens collected into one group. The species in this group which are represented in Rondonia (as seen from the males) are *L. rondoniense* and *L. dasipodogeton*, which are distributed throughout the state, and *L. longispina*, which was only taken on the west

bank of the Madeira River near Porto Velho. The known distribution of *L. dasipodogeton* and *L. rondoniense* is restricted to Rondonia, while *L. longispina* had been taken from Colombia, Venezuela and much of Brazil.

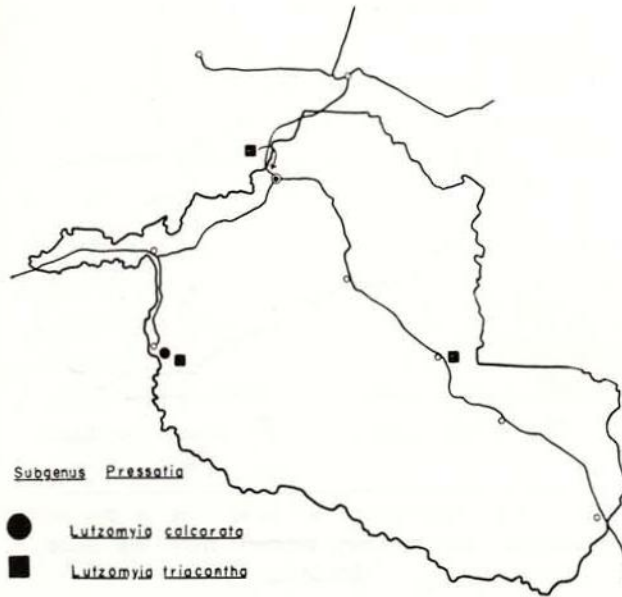


Map. 7 — Distribution of sand flies in the genus *Lutzomyia*, species-group *verrucarum*, from the state of Rondonia.

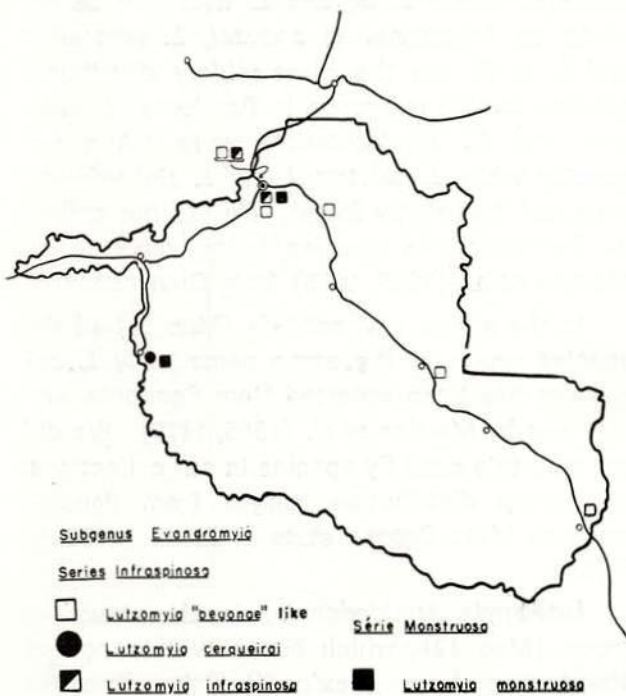


Map. 8 — Distribution of sand flies in the genus *Lutzomyia*, subgenus *Pintomyia*, from the state of Rondonia.

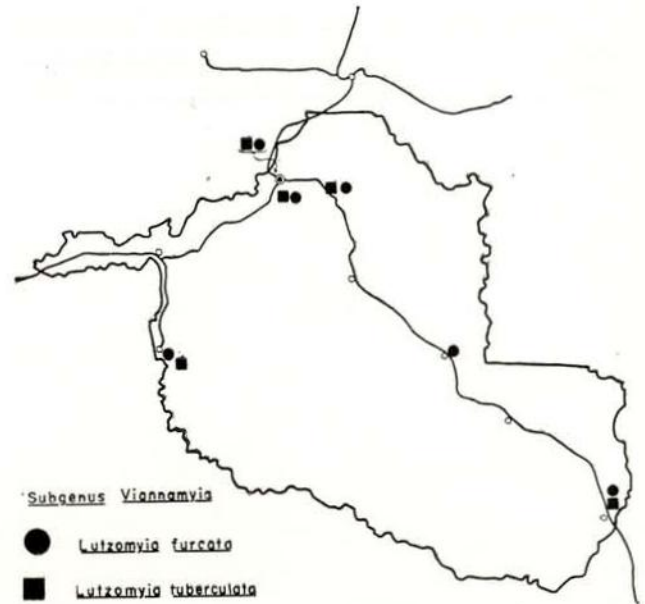
Four species are recorded for Rondonia from the *aragaoi* species group (Map 14). *L. aragaoi* and *L. coutinhoi* in the *aragaoi* series and *L. brasiliensis* and *L. runoides* in the *brasiliensis* series. *L. aragaoi* is widely distributed



Map. 9 — Distribution of sand flies in the genus *Lutzomyia*, subgenus *Pressatia*, from the state of Rondonia.



Map. 10 — Distribution of sand flies in the genus *Lutzomyia*, subgenus *Evandromyia*, from the state of Rondonia.



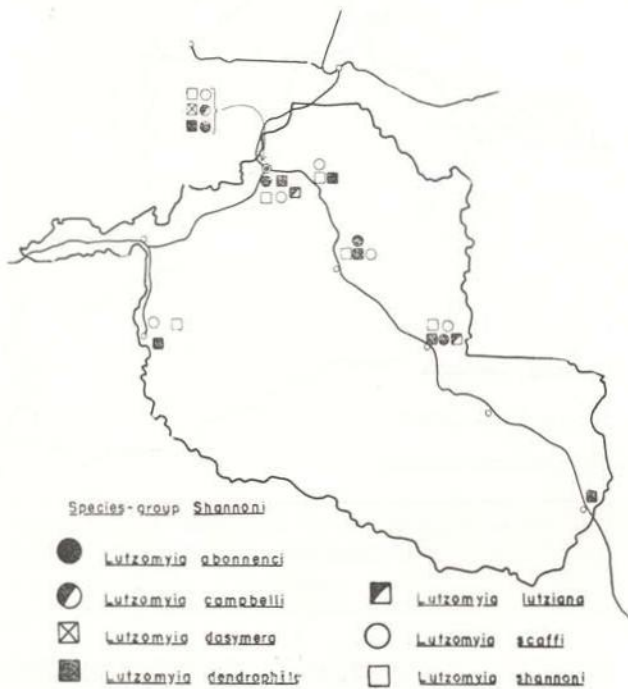
Map. 11 — Distribution of sand flies in the genus *Lutzomyia*, subgenus *Viannamya*, from the state of Rondonia.

throughout the state, while the other species have only been taken from the Guajara-Mirim and Porto Velho areas. *L. aragaoi* ranges from Panama to Paraguay; *L. runoides* from Costa Rica to Brazil and the other two species are more restricted in their distribution to the northern Amazon Basin of Brazil, even though *L. brasiliensis* can also be found throughout southern Brazil.

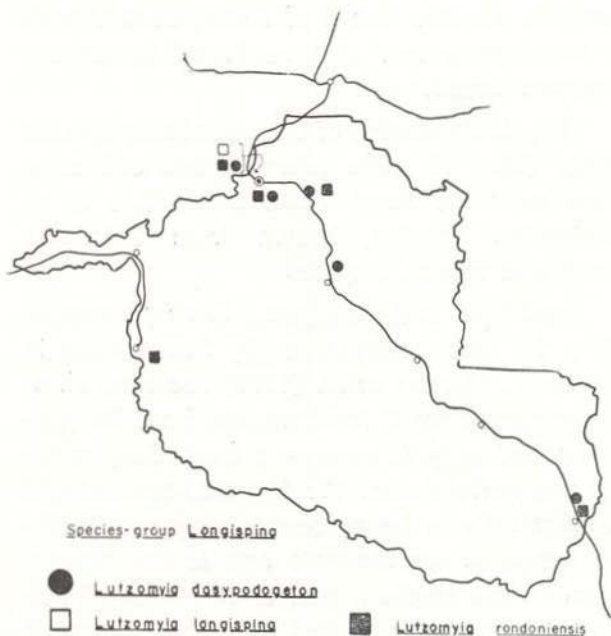
Only *L. dreisbachi* of the *dreisbachi* species group (Map 15) was taken in two collecting sites near the Porto Velho area. This is an Amazonian species, known from Colombia, Brazil and French Guyana.

Sand flies in the subgenus *Trichophoromyia* (Map 16) were represented by five species in Rondonia. Martins *et al.* (1978) recorded all of these, except for *L. loretonensis*, from Guajara-Mirim and only *L. auraensis* from Guajara-Mirim and Porto Velho. We found *L. octavioi* and *L. ubiquitous* to be present throughout Rondonia, while *L. loretonensis* and *L. flochi* were taken in the northern part of the State. Previously, *L. loretonensis* had only been recorded from Peru, thus establishing here a country record for Brazil. The other species of *Trichophoromyia* recorded here have a broad distribution in northern South America.

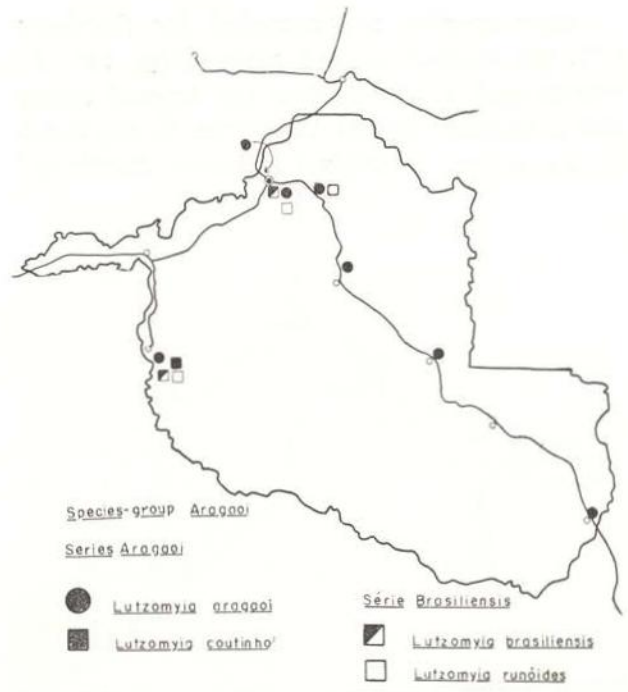
Sand flies in the subgenus *Nyssomyia* (Map 17) were represented by eight species. Most of these species are Amazonian in distri-



Map. 12 — Distribution of sand flies in the genus *Lutzomyia*, species-group *shannoni*, from the state of Rondonia.



Map. 13 — Distribution of sand flies in the genus *Lutzomyia*, species-group *longispina*, from the state of Rondonia.



Map. 14 — Distribution of sand flies in the genus *Lutzomyia*, species-group *aragaoi*, from the state of Rondonia.

bution, and some extend into southern Brazil and neighboring countries, *L. anduzei* as far north as Costa Rica, and *L. whitmani* as far south as Argentina. *L. anduzei*, *L. umbratilis* and *L. yuilli* are the most widely distributed species in this subgenus in Rondonia. *L. antunesi* and *L. flaviscutellata* were taken frequently while *L. whitmani* and *L. richardwardi* were not frequently found. We did not collect *L. inornata*; this species being reported by Martins *et al.* (1965, 1978) from Guajara-Mirim.

In the series *cavennensis* (Map 18) of the species group of the same name, only *L. microcyga* has been reported from Rondonia, and that was by Martins *et al.* (1965, 1978). We did not take this sand fly species in our collections. Its known distribution ranges from Panama south to Mato Grosso state in Brazil, and into Bolivia.

*Lutzomyia trinidadensis*, in the *oswaldoi* group (Map 19), which has a wide range of distribution from Mexico to the Brazilian Amazon and Bolivia, was found to be present in all our collection sites, except the area on the western bank of the Madeira River, across from Porto Velho. *L. rorotaensis*, in this same



group, was taken in limited numbers from the Ariqueemes area. This species has previously been recorded from Colombia, French Guiana and northernmost Brazil.

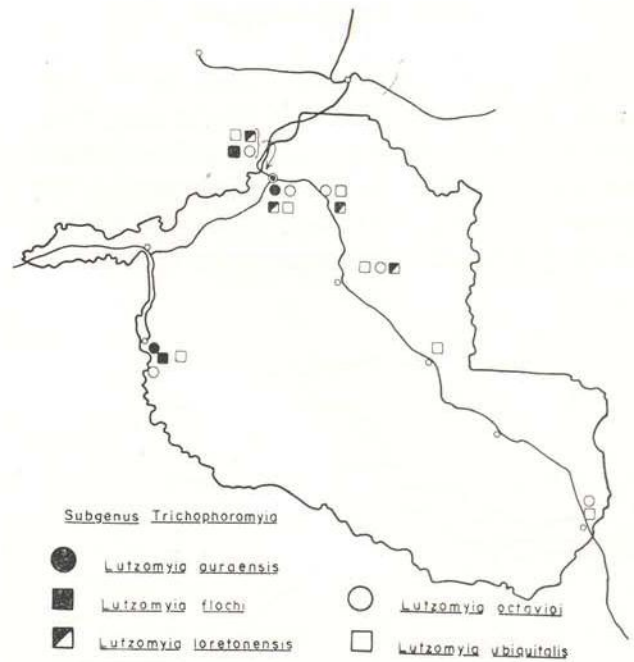
*Lutzomyia pilosa* (Map 20), the only species collected from the *pilosa* group was only taken at eight locations around the Porto Velho area, on both sides of the river. This sand fly is widely distributed from Costa Rica south through Colombia to the northern part of the Brazilian Amazon.

Four species of sand flies, which have not yet been placed in any group, have been taken in Rondonia (Map 21). *L. caligata* (which Martins *et al.* (1978) placed in the *amarali* group), *L. nordestina*, and *L. servulolimai* were recorded by Martins *et al.* (1965, 1978), and we found one other species which appears near *L. nordestina*, yet may not be this species. This *L. sp.* (near *nordestina*) was taken from Porto Velho to Vilhena. We did not take the other species referred to on this map. *L. caligata* is found only from Guajara-Mirim; *L. nordestina* being reported from Panama to southern Brazil, and *L. servulolimai* is known from Peru eastward to Para state in Brazil.

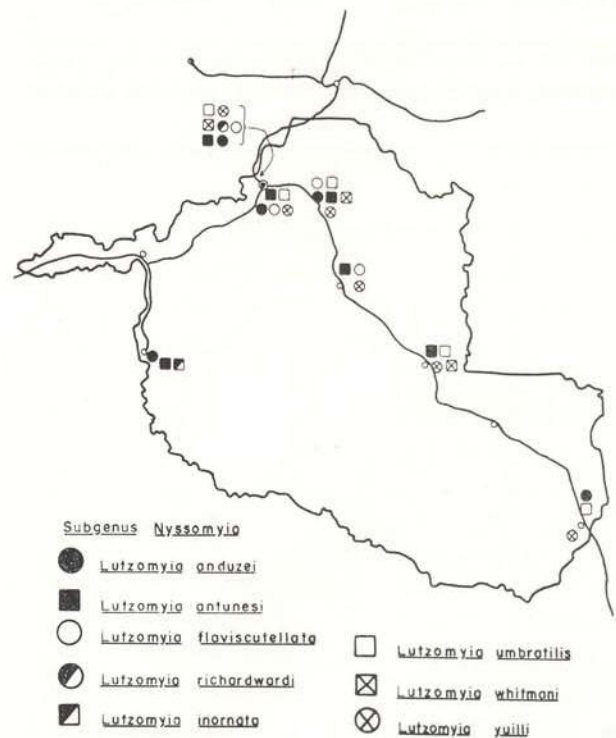


Map. 15 — Distribution of sand flies in the genus *Lutzomyia*, species-group *dreisbachi*, from the state of Rondonia.

The known.



Map. 16 — Distribution of sand flies in the genus *Lutzomyia*, subgenus *Trichophoromyia*, from the state of Rondonia.



Map. 17 — Distribution of sand flies in the genus *Lutzomyia*, subgenus *Nyssomyia*, from the state of Rondonia.

## Genus *Psychodopygus*

At present there exists some controversy in the generic status of New World sand flies, and many authors do not consider *Psychodopygus* a valid genus, but rather a subgenus in the genus *Lutzomyia*. We have chosen, based on existing evidence and arguments, to consider



Map. 18 — Distribution of sand flies in the genus *Lutzomyia*, species-group *cayennensis*, from the state of Rondonia.



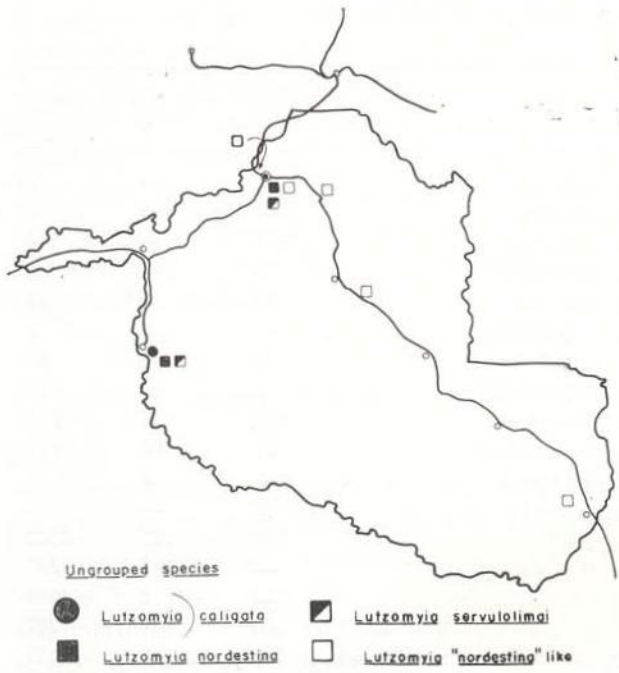
Map. 19 — Distribution of sand flies in the genus *Lutzomyia*, species-group *oswaldoi*, from the state of Rondonia.



Map. 20 — Distribution of sand flies in the genus *Lutzomyia*, species-group *pilosa*, from the state of Rondonia.

this as a valid genus until general agreement is reached by specialists, as to level of recognition.

We took five species of the *chagasi* series in the genus *Psychodopygus* (Map. 22). *P. lainsoni* was the only species in this series that was not widely distributed, only having been taken on the western bank of the Madeira River, across the river from Porto Velho. The other species in this series were taken from Porto Velho to Vilhena; however, their frequency of capture varied from locality to locality. *P. complexus* was taken together with *P. chagasi*; therefore only the males are recorded in Table 1. The females of these two species (641 individuals) have been grouped together as *P. (chagasi)* sp., since at the present time we cannot separate them morphologically. The distribution of *P. complexus* is not clearly defined at the present moment due to the previous confusion at the specific level. The only male specimens of this species that we have seen are those mentioned here, and the type locality is Para state, Brazil. *P. chagasi* is a widely distributed species throughout the Amazon Basin in Colombia, Peru and Brazil. *P. corossoniensis*, another of the species taken in this series, is closely related to *P. guyanen-*

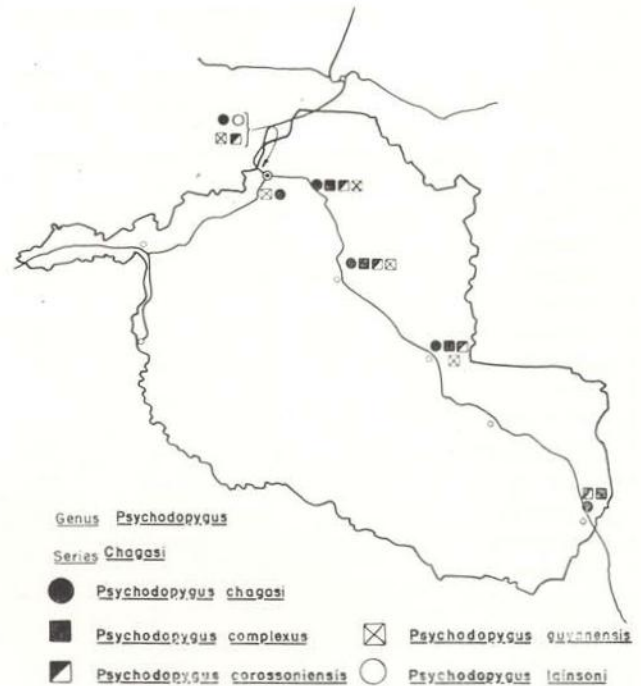


Map. 21 — Distribution of ungrouped sand flies in the genus *Lutzomyia* from the state of Rondonia.

*sis*, and was only known from the male from French Guyana. *P. guyanensis* has been reported from Belize (British Honduras) to the Amazon Basin of Brazil. *P. lainsoni* had only previously been reported from the type locality in Para state, Brazil.

The series *panamensis* (Map. 23) in the genus *Psychodopygus* is represented in Rondonia by ten species, two of which we feel are new, yet will treat separately because they require more study. These have been referred to on the maps as *P. sp. N<sup>o</sup> 1*, which is closely related to *P. davisii*; and *P. sp. N<sup>o</sup> 2*, which is closely related to *P. carrerai*. Both of these species were found from Porto Velho to Jiparana. *P. amazonensis* (as recently defined by Fraiha *et al.*, 1980) was taken in all localities, except Vilhena. The known distribution of this species is that of the Amazon Basin. *P. ayrozai* (as defined by Young, 1980) and which has a range from Panama to southern Brazil, is widely distributed throughout the state. *P. carrerai*, *P. davisii*, *P. paraensis*, and *P. hirsutus* were taken throughout the territory and most of these have the same general distribution throughout the Amazon Basin, yet

The known...



Map. 22 — Distribution of sand flies in the genus *Psychodopygus*, series *chagosi*, from the state of Rondonia.



Map. 23 — Distribution of sand flies in the genus *Psychodopygus*, series *panamensis*, from the state of Rondonia.

TABLE 2 — Sand Flies captured in Rondonia, Brazil, separated by sex

Species	males	females	total
<i>Lutzomyia abonnenci</i>	33	— <sup>a</sup>	33
<i>L. anduzei</i>	44	267	311
<i>L. antunesi</i>	1079	1529	2608
<i>L. aragaoi</i>	42	50	92
<i>L. bacula</i>	1	—	1
<i>L. "begoniae" like</i>	4	66	70
<i>L. campbelli</i>	1	—	1
<i>L. damascenoi</i>	3	—	3
<i>L. dasymera</i>	—	1	1
<i>L. dasypodogeton</i>	109	— <sup>a</sup>	109
<i>L. dendrophila</i>	538	— <sup>a</sup>	538
<i>L. dreisbachi</i>	2	—	2
<i>L. evangelistai</i>	2	—	2
<i>L. flabellata</i>	15	—	15
<i>L. flaviscutellata</i>	32	82	114
<i>L. flochi</i>	2	— <sup>a</sup>	2
<i>L. furcata</i>	15	28	43
<i>L. gomezi</i>	—	4	4
<i>L. longispina</i>	7	— <sup>a</sup>	7
<i>L. loretonensis</i>	85	— <sup>a</sup>	85
<i>L. lutziana</i>	—	1	1
<i>L. marinkellei</i>	1	—	1
<i>L. monstrosa</i>	—	3	3
<i>L. nevesi</i>	—	8	8
<i>L. "nordestina" like</i>	3	10	13
<i>L. octavioi</i>	41	— <sup>a</sup>	41
<i>L. odax</i>	1	—	1
<i>L. pilosa</i>	1	7	8
<i>L. richardwardi</i>	—	1	1
<i>L. rondoniense</i>	62	— <sup>a</sup>	62
<i>L. rorotaense</i>	8	8	16
<i>L. runoides</i>	23	8	31
<i>L. saulensis</i>	5	33	38
<i>L. scaffii</i>	85	— <sup>a</sup>	85

Species	males	females	total
<i>L. sericea</i>	4	—	4
<i>L. serrana</i>	—	8	8
<i>L. shannoni</i>	244	— <sup>a</sup>	244
<i>L. sherlocki</i>	4	—	4
<i>L. spinosa</i>	18	8	26
<i>L. triacantha</i>	—	3	3
<i>L. trinidadensis</i>	33	7	40
<i>L. tuberculata</i>	4	68	72
<i>L. ubiquitousalis</i>	129	131	260
<i>L. umbratilis</i>	55	366	421
<i>L. whitmani</i>	—	4	4
<i>L. wilsoni</i>	15	—	15
<i>L. yuilli</i>	107	1925	2332
<i>L. (Longispina) sp.</i>	— <sup>a</sup>	247	247
<i>L. (Shannoni) sp.</i>	— <sup>a</sup>	1079	1079
<i>L. (Trichophoromyia) sp.</i>	— <sup>a</sup>	387	387
<i>Psychodopygus amazonensis</i>	9	18	27
<i>P. ayrozai</i>	260	1181	1441
<i>P. carrerai</i>	28	671	699
<i>P. chagasi</i>	114	— <sup>a</sup>	114
<i>P. clautrei</i>	28	90	118
<i>P. complexus</i>	9	— <sup>a</sup>	9
<i>P. corossoniense</i>	15	184	199
<i>P. davisii</i>	312	1233	1545
<i>P. guyanensis</i>	14	112	126
<i>P. hirsutus</i>	20	205	225
<i>P. lainsoni</i>	2	5	7
<i>P. llanosmartinsi</i>	4	64	68
<i>P. paraense</i>	7	432	439
<i>P. sp. 1</i>	88	90	178
<i>P. sp. 2</i>	15	72	87
<i>P. (Chagasi) sp.</i>	— <sup>a</sup>	641	641
Total	4081	11337	15418

*P. davisii* can also be found throughout southern Brazil. *P. llanosmartinsi* was found more frequently in Vilhena and not at all in the Porto Velho region, and only one specimen was taken in Ariquemes. The previous known distribution of this species was the type locality in Peru; thus, this also is a new country record. *P. clautrei*, also of Amazonian distribution, was taken from Porto Velho to Ariquemes, not having been found in Ji-Parana or Vilhena.

Recently Abonnenc *et al.* (1980) described *P. robini*, yet from Fraiha *et al.* (1980) papers, Young (personal communication), and our

independent observations, we have concluded that this species is synonymous with *P. amazonensis*.

#### DISCUSSION

Martins *et al.* (1965, 1978) cite 42 species from Rondonia, of which we collected only 26 species. We collected 36 further species which were not previously reported from Rondonia, bringing the total known sand fly fauna of the state to 78 species.

Previous authors reported only *Psychodopygus davisii* in this genus, while we report 15 species for this genus. This great difference

is undoubtedly due to the collecting methods. Sand flies in the genus *Psychodopygus* are rarely taken on natural resting sites or animal burrows, which was the principal methodology they used. Our study, in addition to utilizing tree base captures, also utilized CDC miniature light traps, and man-biting captures (\*). These last two capturing techniques yield many sand flies in this genus.

#### ACKNOWLEDGMENTS

We would like to thank Mr. Artemio Coelho da Silva for the artistic help, and Mr. João Ferreira Vidal, Mr. Raimundo Nonato Lima Santos for their field help, and Secretaria de Administração of the old Federal Territory of Rondonia for their support, and SUCAM teams for their logistical help.

#### RESUMO

Este trabalho expande o conhecimento da distribuição geográfica da fauna flebotômica do Estado de Rondônia, Brasil. Ncvos registros de espécies para o Estado e o País são apresentados, levantando o total de 78 espécies conhecidas em Rondônia.

#### REFERENCES

- ABONNENC, E.; ARIAS, J.R.; LEGER, N.; YOUNG, D.G.  
1980 — Sur *Lutzomyia davisii* (Root, 1934) et les espèces de morphologie comparable (Diptera, Phlebotomidae). *Ann. Parasit.* (Paris), 55 (6): 707-719.
- FRAIHA, H.; WARD, R.D.; QUINTANA, J.  
1980 — Taxonomia de *Psychodopygus amazonensis* (Root, 1934) (Diptera, Psychodidae, Phlebotominae). *Revta da FSESP*, 25 (1): 5-9.
- KILLICK-KENDRICK, R. & WARD, R.D.  
1981 — Workshop n.º 11. Ecology of *Leishmania*. *Parasitology*, 82: 143-152.
- MARTINS, A.V.; FALCÃO, A.L.; SILVA, J.E.  
1965 — Notas sobre os flebotomos do Território de Rondônia. com a descrição de seis espécies novas (Diptera, Psychodidae). *Revta bras. Biol.*, 25: 1-20.
- MARTINS, A.V.; WILLIAMS, P.; FALCÃO, A.L.  
1978 — *American Sand Flies* (Diptera: Psychodidae, Phlebotominae). Academia Brasileira de Ciências. Rio de Janeiro, Brazil. 194pp.
- YOUNG, D.G.  
1980 — *A Review of the Bloodsucking Psychodid Flies of Colombia* (Diptera: Phlebotominae and Sycoracinae). Ag. Exper. Sta. U. of Florida, Gainesville, U.S.A. 266pp.
- YOUNG, D.G. & FAIRCHILD, G.B.  
1974 — *Studies of Phlebotomine Sand Flies*. Annual Report, U.S. Army Research and Development Command, Washington, D.C., U.S.A.

(Aceito para publicação em 08/02/82)

(\*) — Even though we utilized man-biting captures in this study, we no longer use this method of capturing sand-flies due to the high risk involved.