

# LIVING WORLD

Journal of the Trinidad and Tobago  
Field Naturalists' Club

[admin@ttfnc.org](mailto:admin@ttfnc.org)

ISSN 1029-3299



## Collections of Phlebotomine Sand Flies (Diptera: Psychodidae), 1953 - 1977 in Trinidad, West Indies

Elisha S. Tikasingh

Tikasingh, E.S. 2011. Collections of Phlebotomine Sand Flies (Diptera: Psychodidae), 1953 - 1977 in Trinidad, West Indies. *Living World, Journal of The Trinidad and Tobago Field Naturalists' Club*, 2011, 06-13.

*Dedicated to the memory of Dr. Thomas Henry Gardiner Aitken (1912-2007)*

## Collections of Phlebotomine Sand Flies (Diptera: Psychodidae), 1953 - 1977 in Trinidad, West Indies

**Elisha S. Tikasingh\***

Caribbean Epidemiology Centre  
Pan American Health Organisation/World Health Organisation  
16-18 Jamaica Boulevard, Federation Park,  
Port of Spain, Trinidad and Tobago.

\*Present address: 12 Newbury Hill, Glencoe, Trinidad and Tobago.  
*elisha.tikasingh@gmail.com*

### ABSTRACT

During the period 1953-1977 collections of phlebotomine sand flies in Trinidad yielded 21 species in two genera: one *Brumptomyia* and 20 *Lutzomyia*. *L. gomezi* was the most commonly collected and most widely distributed species occurring in 20 of the 26 localities surveyed. One species, *L. flaviscutellata*, is a known vector of enzootic rodent leishmaniasis in Trinidad.

**Key words:** Psychodidae, *Brumptomyia*, *leopoldoi*, *Lutzomyia*, *antunezi*, *aragaoi*, *atroclavata*, *ayrozai*, *barrettoi*, *cayennensis*, *christenseni*, *dubitans*, *flaviscutellata*, *gomezi*, *lichyi*, *micropyga*, *migonei*, *ovallesi*, *pilosa*, *rangeliana*, *shannoni*, *sordellii*, *trinidadensis*, *walkeri*.

### INTRODUCTION

Phlebotomine sand flies, sometimes called “moth flies”, have a worldwide distribution. From a medical point of view they include vectors of the parasite *Leishmania*, the etiological agent of leishmaniasis. Two genera are of importance: *Phlebotomus* in the Old World and *Lutzomyia* in the New World. In Trinidad, these sand flies are generally dispersed throughout the island, but nowhere are they particularly abundant. In contrast to their namesakes, the *Culicoides* sand flies or midges (Aitken *et al.* 1975), they are not especially annoying as a human pest. However, Callan (1947) has reported *Lutzomyia trinidadensis* (as *Phlebotomus trinidadensis*) commonly entering buildings during the evening hours to bite humans at the Imperial College of Tropical Agriculture, now The University of the West Indies, St. Augustine.

The literature dealing with Trinidadian phlebotomines is sparse. The earliest records are those of Knab (1913) who described *Lutzomyia atroclavata* (as *Phlebotomus atroclavatus* Knab) from Gasparee (Gaspar Grande), an islet off the north-west peninsula of Trinidad, and Newstead's (1922) *Lutzomyia trinidadensis* (as *P. trinidadensis*) although no specific locality was mentioned. Since then there have been brief articles and references to species by Myers (1935), Bequaert (1938), Adamson (1939), Callan (1945), Fairchild and Hertig (1948a, b), Fairchild and Trapido (1950) and Young and Duncan (1994). Tikasingh (1969, 1974, 1975) published papers on leishmaniasis including studies on the vector

*Lutzomyia flaviscutellata* (Mangabeira).

The Trinidad Regional Virus Laboratory (TRVL) was established in 1952 to study arthropod-borne viruses (arboviruses) and their vectors (Tikasingh 2000). Aitken *et al.* (1968) described entomological investigations associated with arbovirus studies in the Nariva Swamp (Bush Bush Forest) and reported the collection of 10 species of phlebotomine sand flies, four of which were found to be man biters (*L. amazonensis* = *ayrozai* (Barretto and Coutinho), *L. antunezi* (Coutinho), *L. flaviscutellata* and *L. ovallesi* (Ortiz)). During the course of these investigations covering 16 years (1953-1968), 14,464 phlebotomines were tested for the presence of viruses but none was recovered (Aitken 1960; Aitken *et al.* 1969; TRVL 1968). An additional 11,000 specimens were tested unsuccessfully in 1970 and 1971 (TRVL 1970, 1971). Despite these negative results in Trinidad, many arboviruses have been isolated from *Lutzomyia* spp. in recent years in Brazil and Panama (Young and Arias 1991) and phlebotomines are well-known vectors of viruses elsewhere in the world.

### LOCALITIES

Collections were made between 1953 and 1977 from sites that were generally associated with those where arbovirus field studies were in progress. Chaguaramas was an exception because the United States Naval Station (USNS) occupied the area and collections were made with the assistance of US navy personnel. Elsewhere, most of the collections were in the northern and east-

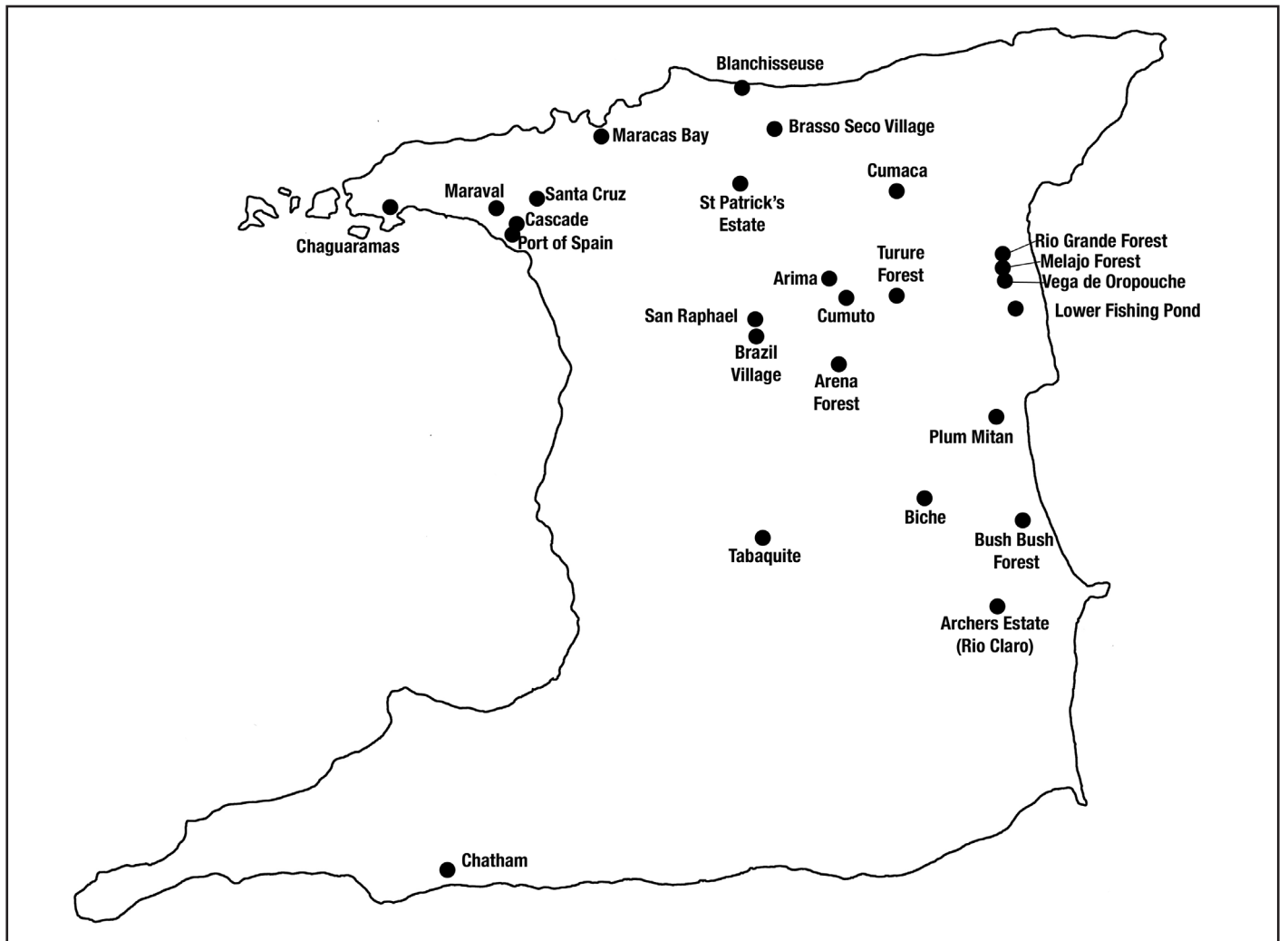


Fig. 1. Collection sites for phlebotomine sand flies in Trinidad, West Indies.

central sections of Trinidad although a single specimen was collected at Chatham in the south-west (Fig. 1). The island was therefore unevenly and selectively surveyed. No studies were conducted in Tobago. Since 1977 there have been no further collections of phlebotomine sand flies by CAREC's staff nor by any other individuals in Trinidad and Tobago.

#### TECHNIQUES

Sand flies were collected in a variety of ways, utilizing human bait (day and night), hand collection, castor oil-treated traps (Disney 1966), CDC light traps (Sudia and Chamberlain 1962), mouse-baited No. 10 (Worth and Jonkers) and No. 17 traps (Davies 1971), chicken-baited traps (Aitken *et al.* 1968), suction sweepers as well as aspiration from tree buttresses and other natural resting sites. Further, the majority of the collections were made at ground level, but some collections were also made in the forest canopy.

Collections were made by T.H.G. Aitken, E.S. Tikasingh, J.B. Davies, Raymond Martinez, F.S. Blanton and J. Sowa. Identifications were done by G.B. Fairchild (Gorgas Memorial Laboratory and the University of Florida, D.J. Lewis (British Museum) and D.G. Young (University of Florida).

Specimens of collected species have been deposited in the United States National Museum in Washington D.C., the Natural History Museum, London, the University of Florida in Gainesville and at TRVL, now the Caribbean Epidemiology Centre (CAREC).

#### RESULTS

A list of the sand flies collected with the total number of collections and number of specimens taken from the 26 collecting sites is given in the accompanying table. A detailed list of each collection is lodged at CAREC giving date of each collection, locality, method of collection, collector, determiner and where each specimen was deposited.

**Table 1.** Phlebotomine sand flies collected by localities from Trinidad, West Indies.

Species	Locality	No. of Collections	No. of Specimens Collected
<i>Brumptomyia leopoldoi</i> (Rodriguez)	Arena Forest	1	1
	Chaguaramas	19	28
	<b>Total</b>	<b>20</b>	<b>29</b>
<i>Lutzomyia antunezi</i> (Coutinho)	Arena Forest	17	53
	Bush Bush Forest	21	32
	Cumuto	1	1
	Rio Claro (Archer's Est.)	1	1
	Santa Cruz	1	1
	Tabaquite	7	42
	Turure Forest	4	6
	Vega de Oropouche	2	2
	Wallerfield	2	3
	<b>Total</b>	<b>56</b>	<b>141</b>
<i>L. aragaoi</i> (Costa Lima)	Arena Forest	2	14
	Chaguaramas	41	99
	Cumuto	2	3
	Port of Spain	1	1
	Santa Cruz	1	1
	Turure Forest	31	64
	<b>Total</b>	<b>78</b>	<b>182</b>
<i>L. atroclavata</i> (Knab)	Chaguaramas	11	11
	Bush Bush Forest	10	22
	Vega de Oropouche	2	2
	<b>Total</b>	<b>23</b>	<b>35</b>
<i>L. ayrozai</i> (Barretto and Coutinho)	Arima	2	7
	Bush Bush Forest	1	1
	Chaguaramas	5	16
	Cumuto	1	1
	Melajo Forest	1	1
	Rio Grande Forest	2	2
	Turure Forest	6	8
	<b>Total</b>	<b>18</b>	<b>36</b>
<i>L. barrettoii</i> (Mangabeira)	Arena Forest	1	4
	Chaguaramas	4	4
	Cumuto	1	12
	<b>Total</b>	<b>6</b>	<b>20</b>

Species	Locality	No. of Collections	No. of Specimens Collected
<i>L. cayennensis</i> (Floch and Abonnenc)	Chaguaramas	6	9
	Bush Bush Forest	12	15
	No locality specified	1	5
	<b>Total</b>	<b>19</b>	<b>29</b>
<i>L. christenseni</i> (Young and Duncan)	Arena Forest	1	1
	Turure Forest	1	1
	<b>Total</b>	<b>2</b>	<b>2</b>
<i>L. dubitans</i> (Sherlock)	Caura	2	5
	Chaguaramas	4	4
	Maraval	1	6
	Turure Forest	2	2
	Vega de Oropouche	1	1
	<b>Total</b>	<b>10</b>	<b>18</b>
<i>L. flaviscutellata</i> (Mangabeira)	Arena Forest	1	3
	Bush Bush Forest	18	27
	Chaguaramas	8	18
	Cumuto	1	3
	Melajo Forest	1	1
	Rio Grande Forest	4	4
	Turure Forest	16	72
	Vega de Oropouche	3	10
	<b>Total</b>	<b>52</b>	<b>138</b>
<i>L. gomezi</i> (Nitzulescu)	Arena Forest	23	83
	Arima	2	2
	Biche	1	1
	Brasso Seco	1	1
	Brazil Village	2	6
	Bush Bush Forest	1	1
	Chaguaramas	43	62
	Cumaca	4	31
	Cumuto	1	4
	Fishing Pond	1	30
	Maracas Bay	1	1
	Maraval	1	3
	Port of Spain	1	1
	Rio Claro (Archer's Est.)	6	8
	Rio Grande Forest	1	1
San Raphael	2	9	

Species	Locality	No. of Collections	No. of Specimens Collected
	Santa Cruz	2	5
	Tabaquite	1	1
	Turure Forest	2	2
	Vega de Oropouche	116	228
	<b>Total</b>	<b>212</b>	<b>480</b>
<i>L. lichi</i> (Floch and Abonnenc)	Arima Valley (Simla)	1	2
	Cumaca	3	3
	Maraval	1	1
	<b>Total</b>	<b>5</b>	<b>6</b>
<i>L. micropyga</i> (Mangabeira)	Bush Bush Forest	11	14
<i>L. migonei</i> (Franca)	Bush Bush Forest	3	4
<i>L. ovallesi</i> (Ortiz)	Blanchisseuse	1	8
	Bush Bush Forest	4	5
	Cascade	1	1
	Chaguaramas	11	18
	Maraval	1	2
	Santa Cruz	2	3
	Vega de Oropouche	3	3
	<b>Total</b>	<b>23</b>	<b>40</b>
<i>L. pilosa</i> (Damasceno and Causey)	Bush Bush Forest	9	14
<i>L. rangeliana</i> (Ortiz)	Bush Bush Forest	3	4
	Turure Forest	1	1
	Vega de Oropouche	27	38
	<b>Total</b>	<b>31</b>	<b>43</b>
<i>L. shannoni</i> (Dyar)	Bush Bush Forest	4	4
<i>L. sordellii</i> (Shannon and Del Ponte)	Bush Bush Forest	5	8
<i>L. trinidadensis</i> (Newstead)	Arena Forest	4	6
	Bush Bush Forest	30	243
	Chaguaramas	12	16
	Chatham	1	1
	Port of Spain	1	1
	Rio Grande Forest	2	2
	Vega de Oropouche	58	82
	Wallerfield	1	1
	<b>Total</b>	<b>109</b>	<b>352</b>

Species	Locality	No. of Collections	No. of Specimens Collected
<i>L. walkeri</i> (Newstead)	Bush Bush Forest	5	196
	Chaguaramas	1	1
	Vega de Oropouche	1	1
	<b>Total</b>	<b>7</b>	<b>198</b>
	<b>Grand Total</b>	<b>703</b>	<b>1793</b>

## REMARKS

The present study records the presence in Trinidad of 21 species of phlebotomines of which one species is referred to the genus *Brumptomyia* and the remaining 20 species to the genus *Lutzomyia*.

### *Brumptomyia leopoldoi*

There are 22 species of this genus in Latin America, but only one species was collected in Trinidad. Of the 20 collections of this species, 19 was made by T.H.G. Aitken and all of his collections were made in Chaguaramas between 1955 and 1958 from light trap collections. Young and Duncan (1994) noted that *B. leopoldoi* was commonly found in armadillo burrows.

### *Lutzomyia antunezi*

The 56 collections consisting of 141 specimens of this species came from nine localities, the majority however, coming from Arena Forest, Bush Bush Forest and Tabaquite. This species is anthropophilic, the majority of the specimens was collected when they attempted to bite or when biting humans.

### *Lutzomyia aragai*

The 182 specimens collected from 78 collections were all made with light traps from six localities.

### *Lutzomyia atroclavata*

The species was originally described from Gasparee Island as *Phlebotomus atroclavatus* by Knab in 1913. Subsequently, 11 specimens were collected by Aitken using light traps between 1955 and 1958 at Chaguaramas. It is not known to be anthropophilic although specimens were taken off human bait in Bush Bush Forest.

### *Lutzomyia ayrozai*

Collections of this species between 1953 and 1962 were made by Aitken, subsequently all others were made by Tikasingh.

### *Lutzomyia barrettoii*

The 20 specimens taken of this species were all light trap collections.

### *Lutzomyia cayennensis*

Collections of this species were made by a variety of methods: light traps, chicken-baited traps, from chicken houses, hand collections and a tree buttress. All except one were made by Aitken between 1955 and 1963. Five specimens collected by Urich in 1921 are in the Natural History Museum, London. Other specimens of *L. cayennensis* are in the University of Florida.

### *Lutzomyia christenseni*

Only two specimens were collected: a female by Aitken in 1955 in Arena Forest and the other, a male by Tikasingh in 1968 at Turure Forest. Both were collected using light traps.

### *Lutzomyia dubitans*

Of 18 specimens collected, 11 were taken in caves: Caura (5) and Perseverance, Maraval (6).

### *Lutzomyia flaviscutellata*

This is an anthropophilic species and was taken using a variety of methods: human bait, No. 10 traps baited with various rodents, oil trap baited with rodents, chicken trap and natural resting sites such as holes in the ground. The normal resting place of the species is under leaf litter. The species is known to transmit leishmaniasis in rodents (Tikasingh 1969, 1970, 1975).

### *Lutzomyia gomezi*

An anthropophilic species, it was the most commonly collected and was the most widespread in Trinidad. A total of 212 collections (480 specimens) was made in 20 of the 26 localities surveyed. It was collected off human bait, from a horse and a monkey, light traps, chicken-baited traps, oil traps and by aspiration with a suction sweeper near the forest floor.

***Lutzomyia lichi***

This is also an anthropophilic species. Five collections were made from Cumaca, Simla (Arima Valley) and Perseverance Cave, Maraval.

***Lutzomyia micropyga***

Eleven collections were made, all from Bush Bush Forest and all by Aitken between 1962 and 1964.

***Lutzomyia migonei***

Aitken (1968) made the three collections, all from Bush Bush Forest in 1961. They were all taken from chicken-baited traps.

***Lutzomyia ovallesi***

Twenty-three collections were made of this anthropophilic species. Of the 40 specimens collected, 10 were taken from caves; 8 from a sea cave in Blanchisseuse by John Davies and two from Perseverance Cave in Maraval.

***Lutzomyia pilosa***

All nine collections were made by Aitken in Bush Bush Forest in 1961-1962.

***Lutzomyia rangeliana***

Thirty collections were made by Aitken at Vega de Oropouche and Bush Bush Forest using chicken-baited traps. The one collection made by Tikasingh was with a light trap at Turure Forest.

***Lutzomyia shannoni***

Four collections were made by Aitken at Bush Bush Forest, 1961-1965.

***Lutzomyia sordellii***

All specimens of this species were taken from Bush Bush Forest by Tikasingh (four collections) and Aitken (one collection).

***Lutzomyia trinidadensis***

A total of 352 specimens was collected which was the second largest number of specimens collected. The majority of collections (88 of 109) however, were made at Vega de Oropouche and in Bush Bush Forest. Tesh (1971 *et al.*) noted females feed on cold-blooded vertebrates and Aitken took four females feeding on the gecko *Thecadactylus brevicauda* (Houttuyn) while Tikasingh collected two females feeding on the same species of gecko at Tucker Valley, Chaguaramas. One specimen was collected from a tree buttress at Chatham in 1972, which represents the only sand fly collected from south-western Trinidad.

***Lutzomyia walkeri***

Aitken collected 197 of the 198 specimens: 196 came from Bush Bush Forest by using chicken-baited traps in 1961 and one came from Vega de Oropouche (La Fortune Estate) in 1959 also from a chicken-baited trap. A single specimen was taken from Chaguaramas in a light trap by Tikasingh.

Records on man-biting activity in Trinidad are associated with eight species: *L. antunezi*, *ayrozai*, *flaviscutellata*, *gomezi*, *ovallesi*, *ayrozai*, *trinidadensis* and *lichi*. The most widely distributed of the sand flies in Trinidad is *L. gomezi* while five species, *L. micropyga*, *L. migonei*, *L. pilosa*, *L. shannoni* and *L. sordellii* were found at only one locality, Bush Bush Forest, an island in the Nariva Swamp. Ten other species were found in the Bush Bush Forest. Thus, 15 of the 20 *Lutzomyia* species collected came from Bush Bush Forest. Further surveys in the south and southwestern Trinidad might reveal the presence of other species not hitherto collected.

**ACKNOWLEDGEMENTS**

I thank the dedicated field and laboratory technicians of the TRVL and CAREC particularly Raymond Martinez, Ambrose Guerra, Joseph Ou Hingwan and Raymond Manuel, all of whom worked under the supervision of the late Dr. Thomas H.G. Aitken and the author.

The studies and observations on which this paper is based were conducted with the support and under the auspices of the Governments of Trinidad and Tobago, Jamaica, British Guiana (now Guyana) and the Eastern Caribbean Territories, the Ministry of Overseas Development of the United Kingdom, the Rockefeller Foundation and the Pan American Health Organisation/ World Health Organisation.

**REFERENCES**

- Adamson, A. M. 1939. Observations on biting sand flies (Ceratopogonidae) in Trinidad, B. W. I. *Tropical Agriculture*, 16: 79-81.
- Aitken, T. H. G. 1960. A survey of Trinidadian arthropods for natural virus infections (August 1953 to December 1958). *Mosquito News*, 20: 1-10.
- Aitken, T. H. G., Worth, C. B., Jonkers, A. H., Tikasingh, E. S. and Downs, W. G. 1968. Arbovirus studies in Bush Bush Forest, Trinidad, W. I., September 1959 - December 1964. II. Field program and techniques. *American Journal of Tropical Medicine and Hygiene*, 17: 237-252.
- Aitken, T. H. G., Spence, L., Jonkers, A. H. and Downs, W. G. 1969. A ten-year survey of Trinidadian arthropods for natural virus infections (1953-1963). *Journal of Medical Entomology*, 6: 207-215.
- Aitken, T. H. G., Worth, C. B. and Tikasingh, E. S. 1968. Ar-



- bovirus studies in Bush Bush Forest, Trinidad, W. I., September 1959 - December 1964. III. Entomological studies. *American Journal of Tropical Medicine and Hygiene*, 17: 253-268.
- Aitken, T. H. G., Wirth, W. W., Williams, R. W., Davies, J. B. and Tikasingh, E. S.** 1975. A review of the bloodsucking midges of Trinidad and Tobago, West Indies (Diptera: Ceratopogonidae). *Journal of Entomology (B)*, 44: 101-144.
- Bequaert, J.** 1938. The distribution of *Phlebotomus* in Central and South America. *Carnegie Institute of Washington*. Pub. No. 499: 229-235.
- Callan, E. Mc.** 1947. A note on *Phlebotomus trinidadensis* Newstead (Dipt.: Psychodidae). *Revista Entomologia (Rio de Janeiro)*, 18: 215-218.
- Davies, J. B.** 1971. A small mosquito trap using animal and carbon dioxide baits. *Mosquito News*, 31: 441-443.
- Disney, R. H. L.** 1966. A trap for phlebotomine sand flies attracted to rats. *Bulletin of Entomological Research*, 56: 445-451.
- Fairchild, G. B. and Hertig, M.** 1948a. Notes on the *Phlebotomus* of Panama (Diptera: Psychodidae). III. *P. cruciatus* Coq., *trinidadensis* Newst. and *gomezi* Nitz. *Annals of the Entomological Society of America*, 41: 247-257.
- Fairchild, G. B. and Hertig, M.** 1948b. Notes on the *Phlebotomus* of Panama (Diptera: Psychodidae) IV. *P. atroclavatus* Knab, *P. cayennensis* Floch and Abonnenc, *P. chiapensis* Dampf and some related forms from the West Indies and Mexico. *Annals of the Entomological Society of America*, 41: 455-467.
- Fairchild, G. B. and Trapido, H.** 1950. The West Indian species of *Phlebotomus* (Diptera: Psychodidae). *Annals of the Entomological Society of America*, 43: 405-417.
- Knab, F.** 1913. A new American *Phlebotomus*. *Insecutor Inscitiae Menstruus*, 1:135-137.
- Myers, J. G.** 1935. The sandfly pest (*Culicoides*). *Tropical Agriculture*, 12: 71-73.
- Newstead, R.** 1922. A new species of *Phlebotomus* from Trinidad. *Annals of Tropical Medicine and Parasitology*, 16: 47-50.
- Sudia, W. D. and Chamberlain, R. W.** 1962. Battery operated light trap, an improved model. *Mosquito News*, 22: 126-129.
- Tesh, R. B., Chaniotis, B. N., Aronson, M. D. and Johnson, K. M.** 1971. Natural host preferences of Panamanian sand flies as determined by precipitin tests. *American Journal of Tropical Medicine and Hygiene*, 20: 150-156.
- Tikasingh, E. S.** 1969. Leishmaniasis in Trinidad. A preliminary report. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 63: 411.
- Tikasingh, E. S.** 1970. Enzootic rodent leishmaniasis in Trinidad, West Indies. *Bulletin of the Pan American Health Organisation*, 8: 232-242.
- Tikasingh, E. S.** 1975. Observations on *Lutzomyia flaviscutellata* (Mang.) (Diptera: Psychodidae), a vector of enzootic leishmaniasis in Trinidad, W. I. *Journal of Medical Entomology*, 12: 228-232.
- Tikasingh, E. S.** 2000. The Hunt for Caribbean Viruses: A History of the Trinidad Regional Virus Laboratory. Port of Spain, Trinidad and Tobago: Caribbean Epidemiology Centre, 156 p.
- TRVL (Trinidad Regional Virus Laboratory).** 1968, 1970, 1971. Annual Reports.
- Young, D. G. and Arias, J. R.** 1991. Phlebotomine sand flies in the Americas. *PAHO Technical Paper*, 33: 1-26.
- Young, D. G. and Duncan, M. A.** 1994. Guide to the identification and geographic distribution of *Lutzomyia* sand flies in Mexico, the West Indies, Central and South America (Diptera: Psychodidae). *Memoirs of the American Entomological Institute*, 54: 1-881.