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Phlebotomine sand flies (Diptera: Psychodidae) of Chiapas collected near the Guatemala border, with additions to the fauna of Mexico and a new subgenus name

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Abstract

Collections from four localities, two of the High Plateau and two of the Eastern Mountains Municipality of Chiapas, near the border with Guatemala, included 26 species with four new species records for Mexico: *Lutzomyia (Helcocyrtomyia) hartmanni* (Fairchild & Hertig, 1957), *Dampfomyia (Coromyia) disneyi* (Williams, 1987), *Psychodopygus bispinosus* (Fairchild & Hertig, 1951), and *Psychodopygus corossoniense* (LePont & Pajot, 1978). These records represent an updated total of 50 species in Mexico, 48 of which are extant species and the remaining two fossils. The name *Xiphopsathyromyia n. n.* is proposed in substitution of *Xiphomyia* Artemiev, 1991, a homonym of *Xiphomyia* Townsend, 1917, a genus of Tachinidae (Diptera).

Key words: taxonomy, fauna, new records, leishmaniasis vectors

Introduction

Records of Phlebotominae for the state of Chiapas, Mexico include 27 species (Dampf 1947, Ibáñez-Bernal 1999, 2000, 2001a and b, 2002, 2003, 2004, 2005a, 2005b, Mickery-Pacheco *et al.* 2012, Pérez *et al.* 2014) representing 59% of all phlebotomine species recorded for Mexico to date. Despite the fact that Chiapas is the state in Mexico with the greatest richness of phlebotomine species, faunistic studies are rare and geographic records of species are few.

In addition to being of great significance for its biodiversity, Chiapas is ethnically diverse, with a dense human population that has historically been marginalized. These socio-economic factors exert considerable pressure on the natural resources of the state. Furthermore, these factors, in combination with the presence of sand fly vectors, contribute to an elevated risk of transmission of zoonotic pathogens, such as *Leishmania* species. In Chiapas there have been reports of leishmaniasis in the period between 1981 and 2010. Of these reports, approximately 1,892 are the clinical form of localized cutaneous leishmaniasis, with 7 cases of mucocutaneous, 11 diffuse cutaneous, and 124 visceral leishmaniasis (Data courtesy Dr. Carmen Guzmán Bracho, from Sistema Único de Información Epidemiológica, Secretaría de Salud, Mexico). In order to make effective decisions in the management of Leishmaniasis, the National and State surveillance program are dependent on accurate characterizations of the phlebotomine fauna, particularly those species related to the transmission of *Leishmania* parasites.

We systematically sampled phlebotomine sand flies in four localities of Chiapas near the Mexico-Guatemala border during different seasons over a period of two years. Here we present diagnoses and information pertaining to the sandfly species collected. Four species are recognized as new records for Mexico. Moreover, the name *Xiphopsathyromyia n. n.* is proposed in substitution of *Xiphomyia* Artemiev, a homonym of *Xiphomyia* Townsend, a genus of Tachinidae (Diptera).

Material and methods

Study area. This work was conducted in four localities of the western portion of the state of Chiapas, Mexico on the border with Guatemala. Two of these localities are in the High Plateau of Chiapas, or Meseta Central. San Antonio Buena Vista is part of the municipality of Independencia (16° 09' 08" N; 91° 38' 58.9" W; 1,380 masl), and Tziscaco belongs to the municipality of Trinitaria (16° 04' 52.6" N; 91° 40' 01.4" W; 1,510 masl). At San Antonio Buena Vista, anthropogenic activities have resulted in significant impacts on the ecosystem. Currently there remain only small patches of native vegetation, and in poor condition. Originally, these habitats could be characterized as an ecotone with tropical forest and oak forest intermixed. Tziscaco also shows evidence of anthropogenic perturbation, but in contrast, the vegetation at this site is composed of pine, oak and *Liquidambar* trees (Rzedowski 1986). These localities have a temperate-humid climate (C (fm)), annual mean temperature of 23.6°C and a thermal annual oscillation of 5.6°C, coldest in January (mean temperature of 20.9°C) and warmest in April (mean temperature of 25.6°C). Rain falls throughout the year, with an annual precipitation of 600–1200 mm (García 1981). The remaining two collection localities belong to the physiographic region known as Eastern Mountains (Montañas del Oriente). Guadalupe Miramar (16° 09' 22.6" N; 91° 16' 45.2" W; 432 masl) and Loma Bonita (16° 11' 53" N; 91° 11' 88.4" W; 210 masl) are both in the municipality of Maravilla Tenejapa. In these two localities, the original vegetation is evergreen forest (Rzedowski 1986); however, only fragments of the original forest remain. Climate is predominantly warm-subhumid (A (m)), with abundant rainfalls in the summer and two maximum rain peaks separated by two dry periods. The annual mean temperature is 25 °C, and annual precipitation between 2,300 and 3,500 mm (García 1988).

Collection of phlebotomine sand flies. Collections were made using miniature CDC light traps (Mod. 512), and modified Magoon traps baited with a bite-protected human. CDC light traps were placed at five houses in four transects at each locality. One house was at the town center and the other four houses were at edges, all separated by the same distance. At each house, two CDC traps were placed; one was indoors and the other in the peridomicile. The four transects were established from outermost distant houses in each locality and the lines were oriented to the four cardinal points: north, south, east and west, with transects of 500 m with four collection sites. The first collection site was established at 50 m from the house on the edge of the locality, the second at 100 m, the third at 250 m and the last at 500 m. CDC traps were active during 12 hours, from 18:00 to 06:00 h in winter (from October to March) and from 19:00 to 07:00 h in summer time (from April to September). Modified Magoon traps baited with two protected persons were placed in the outskirts of towns, being active four hours from 18:00 to 22:00 h in winter hours and from 19:00 to 23:00 h in the summer time. At each trap, we allowed a period of 50 min for the attraction of sandflies and 10 min after for the collection of flies entering the traps.

Sorting of sand flies, slide mounting and identification. Flies were killed with chloroform and preserved in 70% ethanol. Specimens were cleared, dissected and permanently mounted on microscope slides following the procedure outlined by Ibáñez-Bernal (2005a). Specimens were examined using a Nikon Eclipse 50i compound microscope equipped with phase contrast. Drawings were rendered with the aid of a Nikon Y-IDT drawing tube and digitally processed using Corel Photo Paint X3 (Version 13). All specimens are deposited in the Entomological Collection of Centro Regional de Investigación en Salud Pública (CRISP), Tapachula, Chiapas, Mexico.

Throughout this paper, we follow the phylogenetic classification proposed by Galati (1995, 2003). Abbreviations for genera and subgenera follow the proposal of Marcondes (2007).

Results

A total of 1,119 phlebotomine sand flies comprising 10 genera and 26 species were studied (Table 1).

Tribu Phlebotomini Rondani, 1840

Flebotomidae (as tribe) in Flebotominae (as family) Rondani, 1840: 10, 12. Type genus: *Flebotomus* (amended to *Phlebotomus* by Agassiz, 1864, fixed such by suspension of rules ICZN, 1954; Opinion 236: 199 to avoid confusion, because this spelling had come into general use). Additional references: Lewis *et al.*, 1977: 321; Artemiev, 1991: 71; Galati, 1995: 135, 136, 139; Galati, 2003: 31.

Diagnosis. Thorax with proepimeral and upper anepisternal setae; metathoracic furca with horizontal arms; abdominal terga with setae not arranged in bands (Galati 2003).

TABLE 1. Species recorded in the state of Chiapas, Mexico.

Species	Previously recorded	Recorded in this work		Total
		♂	♀	
<i>Brumptomyia hamata</i>	X	9	–	9
<i>Br. mesai</i>	●	28	–	28
<i>Micropygomyia (Sauromyia) trinidadensis</i>	●	X	1	1
<i>Mi. (Coquilletimyia) chiapanensis</i>	●	X	2	2
<i>Mi. (Micropygomyia) cayennensis maciasi</i>	●	X	X	X
<i>Lutzomyia (Tricholateralis) cruciata</i>	●	26	129	155
<i>Lu. (Lutzomyia) longipalpis</i>	●	X	2	2
<i>Lu. (Helcocyrtomyia) hartmanni</i>	▲	42	7	49
<i>Pintomyia (Pifanomyia) evansi</i>	●	X	X	X
<i>Pi. (Pifanomyia) ovallesi</i>	●	26	203	229
<i>Pi. (Pifanomyia) serrana</i>	●	2	19	21
<i>Dampfomyia (Coromyia) beltrani</i>	●	6	–	6
<i>Da. (Coromyia) deleoni</i>	●	29	–	29
<i>Da. (Coromyia) steatopyga</i>	●	X	X	X
<i>Da. (Coromyia) disneyi</i>	▲	16	–	16
<i>Da. delpozoi</i>	●	1	8	9
<i>Dampfomyia inusitata</i>	●	X	X	X
<i>Da. (Dampfomyia) atulapai</i>	●	X	X	X
<i>Da. (Dampfomyia) dodgei</i>	●	X	X	X
<i>Da. (Dampfomyia) permira</i>	●	4	35	39
<i>Trichopygomyia triramula</i>	X	1	7	8
<i>Psathyromyia (Forattiniella) carpenteri</i>	●	23	10	33
<i>Ps. (Forattiniella) texana</i>	●	3	20	23
<i>Ps. (Xyphopsathyromyia) aclydifera</i>	●	1	1	2
<i>Ps. (Psathyromyia) cratifer</i>	●	X	–	X
<i>Ps. (Psathyromyia) undulata</i>	●	1	–	1
<i>Ps. (Psathyromyia) dasymera</i>	●	1	X	1
<i>Ps. (Psathyromyia) shannoni</i>	●	3	20	23
<i>Bichromomyia olmeca olmeca</i>	●	3	7	10
<i>Psychodopygus bispinosus</i>	▲	8	7	15
<i>Ps. corossoniense</i>	▲	6	6	12
<i>Ps. panamensis</i>	●	312	75	387
<i>Nyssomyia ylephiletor</i>	●	3	6	9

● = previously recorded in Chiapas; X= previously unknown in Chiapas; ▲= previously unknown in Mexico; – = females of these species cannot be differentiated from other similar species.

Subtribe *Brumptomyiina* Artemiev, 1991

Brumptomyiina Artemiev, 1991: 72 (Type genus: *Brumptomyia* França & Parrot, 1921). Additional references: Galati, 1995: 135, 136, 139; Galati, 2003: 31.

Diagnosis. Antennal flagellomere 1 with ascoids originated at different level, the external ascoid basad as compared with the internal one. Male: gonostylus with two spiniform setae originated from one tubercle. Female: cibarium with longitudinal rows of horizontal teeth; spermathecal individual ducts four or more times as long as spermatheca; spermathecae annulated (Galati 2003).

Remarks. This subtribe includes the Neotropical genera *Brumptomyia* França & Parrot, 1921, widely distributed from Mexico to Argentina, and *Oligodontomyia* Galati, 1995, with three species distributed in Peru, Bolivia and Chile (Galati 2003).

***Brumptomyia* França & Parrot, 1921**

Phlebotomus (Brumptomyia) França & Parrot, 1921: 281 (as subgenus). Type species: *Phlebotomus brumpti* Larrousse, 1920 (designated by Dyar, 1929: 112).

Brumptomyia França & Parrot, 1921 (as genus): Theodor, 1948: 104; Theodor, 1965: 173, 180; Forattini, 1973: 521; Martins *et al.*, 1978: 9; Artemiev, 1991: 72; Young & Duncan, 1994: 36 (keys); Ibáñez-Bernal, 1999: 66 (taxonomic history); Galati, 2003: 31 (classification, species list).

Diagnosis. Antennal flagellomeres with ascoids composed by one long distal branch and a short proximal branch; thorax with no post-alar bristle; male genitalia with gonocoxite having a longitudinal internal row of strong setae on distal half; female cibarium with several longitudinal rows of horizontal teeth and with sclerotized bulge posterior to teeth (Galati 2003).

Remarks. 26 species have been described, with only two previously recorded in Mexico (Ibáñez-Bernal 1999). Currently there are no useful morphological characters to separate females of different species and for that reason the females recorded here are presented separately as *Brumptomyia* spp.

***Brumptomyia hamata* (Fairchild & Hertig, 1947)**

Phlebotomus (Brumptomyia) hamatus Fairchild & Hertig, 1947a: 614, Figs. 1–2 (♂). Type locality: Panama, Chilibre, cuevas de murciélago de Chilibrillo.

Brumptomyia hamata (Fairchild & Hertig): Forattini, 1973: 523, 531, Fig. 157E (♂ diagnosis); Martins *et al.*, 1978: 15 (geographic records); Young, 1979: 38 (taxonomic history, distribution), Ibáñez-Bernal, 1999: 68, Figs. 1–5 (Mexico, ♂ redescription of Mexican specimens); Cáceres & Galati, 2001: 101 (Peru, list); Galati, 2003: 31 (listed).

Diagnosis. Male: paramere simple; gonocoxite with basal tuft of long simple setae not arising from tubercle, and a longitudinal row of 6 long setae on internal surface (Fairchild & Hertig 1947a, Ibáñez-Bernal 1999).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 12-v-2010, 1 ♂; 13-v-2010, 1 ♂. Loma Bonita, 20-x-2009, 1 ♂; 22-x-2009, 1 ♂; 22-iii-2010, 2 ♂; 16-vi-2010, 2 ♂; 12-ii-2011, 1 ♂. All collected with CDC light traps.

Distribution. MEXICO (Campeche, Veracruz) (Ibáñez-Bernal 1999), BELIZE, PANAMA, ECUADOR (Martins *et al.* 1978), COLOMBIA (Bejarano 2006, Pérez-Doria *et al.* 2008, Young 1979), PERU (Cáceres & Galati 2001). This is the first record for the state of Chiapas.

Remarks. In the collection area, *Brumptomyia hamata* is less abundant than *Br. mesai* Sherlock. *Brumptomyia* species are not anthropophilous, being associated with armadillo burrows.

***Brumptomyia mesai* Sherlock, 1962**

Brumptomyia mesai Sherlock, 1962: 332 (♂). Type locality: Colombia, Santander, San Vicente de Chucuri. Additional references: Williams, 1970b: 331; Young, 1975: 17, 20 (keys, differences with *Br. galindoi*); Ibáñez-Bernal, 1999: 70, Figs. 6–20 (recovered from its synonymy with *Br. galindoi*); Galati, 2003: 31 (listed); Bejarano *et al.*, 2007: 990 (record from Colombia); Ibáñez-Bernal *et al.*, 2011: 31 (Veracruz record); May-Uc *et al.*, 2011: 279 (Quintana Roo records).

Phlebotomus galindoi Fairchild & Hertig, 1947a: Vargas & Díaz-Nájera, 1953b: 311; Fairchild & Hertig, 1959: 122.

Phlebotomus (Brumptomyia) galindoi Fairchild & Hertig: Díaz-Nájera, 1963: 193, (♂; ♀ description).

Brumptomyia galindoi (Fairchild & Hertig): Fraiha *et al.*, 1970: 468 (synonymy of *Br. mesai* with *Br. galindoi*); Forattini, 1973: 528; Martins *et al.*, 1978: 14 (at least the Mexican record); Young, 1979: 36 (revision); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records); Rebollar-Téllez *et al.*, 2006: 22 (Yucatán records).

Diagnosis. Male: paramere simple and thin; gonocoxite with basal tuft of foliaceous setae arising from a prominent tubercle, and a longitudinal row of 5 or 6 long setae on internal surface (Fairchild & Hertig 1947a, Ibáñez-Bernal 1999).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 01-ix-2009, 1 ♂; 12-v-2010, 12 ♂; 13-v-2010, 4 ♂; 20-x-2010, 1 ♂; 10-ii-2011, 1 ♂; 15-iii-2011, 1 ♂. Loma Bonita, 02-ix-2009, 1 ♂; 20-x-2009, 1 ♂; 22-x-2009, 1 ♂; 08-xii-2009, 1 ♂; 9-xii-2009, 1 ♂; 16-v-2010, 1 ♂; 21-xi-2010, 1 ♂; 12-ii-2011, 1 ♂. All collected with CDC light traps.

Distribution. MEXICO (Campeche, Chiapas, Quintana Roo, Veracruz), BELIZE, HONDURAS, COSTA RICA, PANAMA, COLOMBIA, ECUADOR, PARAGUAY (Young 1979; Galati 2003).

Remarks. It remains necessary to reevaluate the geographic distribution of *Br. galindoi* and *Br. mesai*. This species, as with others in *Brumptomyia*, is not anthropophilous and is thought to be associated with armadillo burrows.

Unplaced females of *Brumptomyia* spp.

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 10-xii-2009, 1 ♀; 10-ii-2011, 2 ♀. Loma Bonita, 21-ii-2010, 2 ♀; 19-iii-2010, 1 ♀; 20-iii-2010, 2 ♀. All collected with CDC light traps.

Subtribe *Sergentomyiina* Artemiev, 1991

Sergentomyiina Artemiev, 1991: 72. Type genus: *Brumptomyia* França & Parrot, 1921. Additional references: Galati, 2003: 32, 68 (list, keys).

Diagnosis. Palpal segment 2 as long or shorter than palpal segment 4; Newstead's scales present in the basal half of palpal segment 3; antennal flagellomere 3 without sensory papilla (rosette-like sensillum) but flagellomere 11 with this kind of sensilla in the apical, median and basal region. Thorax nearly always with ventro-cervical sensillae, but if absent then with a patch of setae on the anterior portion of katepisternum. Male: antennal flagellomere 1 with external ascoid originated apically as compared with internal ascoid; gonocoxite without a longitudinal row of strong setae distally; gonostylus variable but never with two spiniform setae originated from the same tubercle. Female: hypopharynx with few scarcely developed teeth or without them; cibarium with vertical teeth arranged in one or two transversal rows, horizontal and lateral teeth present (Galati 2003).

Remarks. The original concept of this subtribe by Artemiev (1991) included only the Old World genus *Sergentomyia* França & Parrot, 1920, with 12 subgenera, but later Galati (2003) added the South American *Deanemyia* Galati, 1995, the Neotropical *Micropygomyia* Barretto, 1962, and provided for the first time a diagnosis of the subtribe.

Micropygomyia Barretto, 1962

Lutzomyia (*Micropygomyia*) Barretto, 1962: 95 (as subgenus). Type species: *Phlebotomus cayennensis* Floch & Abonnenc. Additional references: Forattini, 1971a: 100 (in part); Forattini, 1973: 335 (in part); Martins *et al.*, 1978: 60 (in part); Young & Duncan, 1994: 633 (revision of species); Ibáñez-Bernal, 2003: 114 (Mexican species).

Lutzomyia species group *cayennensis*: Theodor, 1965: 186; Lewis *et al.*, 1977: 325.

Lutzomyia subgenus *Coromyia* Barretto: Forattini, 1971a: 101; Forattini, 1973: 292 (in part).

Lutzomyia subgenus *Trichopygomyia* Barretto: Forattini, 1971a: 101; Forattini, 1973: 292 (in part).

Lutzomyia species group *atroclavata*: Martins *et al.*, 1978: 129 (in part).

Lutzomyia subgenus *Helcocyrtomyia* Barretto: Williams, 1991: 535 (in part).

Micropygomyia Barretto: Artemiev, 1991: 74 (in part, as a genus); Galati, 1995: 136; Galati, 2003: 32 (listed).

Diagnosis. Antenna with simple nearly always short ascoids. Labial sclerotized furca present. Anterior area of katepisternum nude and without postalar seta. Male gonostylus with one or two apical spiniform setae and one internal spiniform seta present or absent, preapical setae absent; paramere simple, without dorsal protuberance or projection. Female spermathecal common duct shorter than individual spermathecal ducts (Young & Duncan 1994, Galati 2003).

Remarks. Genus *Micropygomyia* as defined includes the subgenera *Mi. (Silvamyia)* Galati, 1995, *Mi. (Sauromyia)* Artemiev, 1991, *Mi. (Coquilletimyia)* Galati, 1995 and *Mi. (Micropygomyia) s. str.* Barretto, 1962 (Galati 2003) with about 45 species. Species of these subgenera, except *Mi. (Silvamyia)*, have been recorded in Mexico.

Micropygomyia (Sauromyia) Artemiev, 1991

Sauromyia Artemiev, 1991: 74 (as subgenus of *Micropygomyia*). Type-species: *Flebotomus oswaldoi* Mangabeira, 1942.

Additional references: Galati, 2003: 32 (listed).

Helcocyrtomyia Barretto, 1962: 96 (as subgenus of *Lutzomyia*). Additional references: Martins *et al.*, 1978: 68.

Lutzomyia species group *oswaldoi*: Theodor, 1965: 187; Lewis *et al.*, 1977: 325; Young & Duncan, 1994: 675.

Lutzomyia subgenus (*Trichopygomyia*): Forattini, 1971a: 101; Forattini, 1973: 292 (in part).

Diagnosis. Antennal ascoids short, not reaching the distal margin of flagellomere; palpus segment 5 longer than 3. Male: flagellomere 1 not surpassing the length of head; gonostylus with 4 or 5 spiniform setae; if only 4 spiniform setae the gonocoxite has a median tuft of setae, but if 5 the tuft present or absent. Female: cibarium with 4 horizontal teeth; flagellomere 1 as long as 0.75 the head length; flagellomere 2 with ascoids longer than one-half the length of the article, reaching or ending apical to the sensorial papilla; spermathecae annulated or smooth, common duct shortest than individual ducts (Galati 2003).

Remarks. Galati (2003) recognized two series of species, *Mi. (Sau.)* series *atroclavata* Fairchild, 1955, and *Mi. (Sau.)* series *oswaldoi* Barretto, 1962, which include 17 (one fossil species) and two species, respectively. In Mexico series *oswaldoi* is represented by one fossil and two extant species. There are no records of any other species of the *atroclavata* series.

Micropygomyia (Sauromyia) trinidadensis (Newstead, 1922) (series oswaldoi)

Phlebotomus trinidadensis Newstead, 1922: 47 (♂, ♀). Type locality: Trinidad. Additional references: Fairchild & Hertig, 1948a: 253 (references, taxonomy).

Phlebotomus yucatanensis Galliard, 1934a: 1 (♂, ♀). Type locality: Mexico, Yucatán, near Chichen Itzá. Additional references: Fairchild & Hertig, 1948a: 255 (as synonym of *trinidadensis*).

Phlebotomus yucatanensis var. *baduelensis* Floch & Abonnenc, 1941a: 4 (♂). Type locality: French Guiana, Baduel. Additional references: Fairchild & Hertig, 1948a: 255 (as synonym of *trinidadensis*).

Phlebotomus villelai Mangabeira, 1942a: 196 (♂). Type locality: Brazil, Ceara and Pará. Additional references: Barretto, 1946b: 527 (as synonym of *baduelensis*); Fairchild & Hertig, 1948a: 255 (as synonym of *trinidadensis*).

Phlebotomus baduelensis Floch & Abonnenc, 1944e: 1 (♂, ♀). Type locality: French Guiana. Fairchild & Hertig, 1948a: 255 (as synonym of *trinidadensis*); Floch & Abonnenc, 1952: 163.

Lutzomyia trinidadensis (Newstead): Young & Duncan, 1994: 683 (as species group *Oswaldoi*, taxonomic history, figures, keys, taxonomy). Additional references: Ibáñez-Bernal, 2003: 130 (diagnosis, references); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records), Rebollar-Téllez *et al.*, 2006: 24 (Yucatan records), May-Uc *et al.*, 2011: 279 (Quintana Roo records).

Micropygomyia (Sauromyia) trinidadensis (Newstead): Galati, 2003: 33 (listed).

Diagnosis. Male: Clypeus longer than 0.3 of the total length of head; apodeme and ejaculatory pump about 3.5 the length of the ejaculatory ducts, these with simple not modified apex; paramere suddenly sharpened at middle; lateral lobe shorter than gonocoxite; gonocoxite without a consolidated tuft of setae, but with about 7 isolated perennial fine setae distributed at middle; gonostylus with the basal spiniform setae robust, similar in length and at same level (2+1+2). Female: cibarium with a dome-shaped protuberance, two pairs of horizontal teeth which are more separated at middle and without vertical teeth or at least difficult to see; pharynx with spines; spermathecae banana-shaped, walls smooth (Young & Duncan 1994, Galati 2003).

Material examined. MEXICO: CHIAPAS: Loma Bonita, 06-vii-2010, CDC light trap, 1 ♀.

Distribution. MEXICO (Campeche, Chiapas, Quintana Roo, Yucatán) (Ibáñez-Bernal 2003; Ibáñez-Bernal 2005a), BELIZE, GUATEMALA, HONDURAS, NICARAGUA, COSTA RICA, PANAMA, COLOMBIA, VENEZUELA, TRINIDAD, FRENCH GUYANA, ECUADOR, PERU, BRAZIL, BOLIVIA (Martins *et al.* 1978; Young & Duncan 1994).

Remarks. This species was not abundant in the studied specimens. This species is not anthropophilous, with females feeding on ectothermic vertebrates (Tesh *et al.* 1971).

Micropygomyia (Coquillettimyia) Galati, 1995

Lutzomyia species group *vexatrix*: Theodor, 1965: 183 (in part).

Lutzomyia species group *vexator* series *vexator*: Lewis *et al.*, 1977: 325.

Micropygomyia (Coquillettimyia) Galati, 1995: 136. Type species: *Flebotomus vexator* Coquillett, 1907. Additional references: Galati, 2003: 33, 68 (list, key).

Diagnosis. Pharynx spines absent; Male: Antennal flagellomere 1 shorter than head; gonocoxite with a basal tuft of 4 to 7 setae; gonostylus with two apical and the internal spiniform setae originated before middle. Female: Antennal flagellomere 1 no longer than 0.75 the head length; flagellomere 2 internal ascoid reaching or surpassing the level of papilliform sensilla; cibarium with 2 or more pairs of horizontal teeth; spermatheca small, globular or longer, striated or annulated (Young & Duncan 1994, Galati 2003).

Remarks. Galati (2003) recognized two series of species in this subgenus, the series *vexator* and *chiapanensis*, both with species distributed in Central America, Mexico and the United States. In this work one species of series *chiapanensis* is reported.

Micropygomyia (Coquillettimyia) chiapanensis (Dampf, 1947)

Phlebotomus chiapanensis Dampf, 1947: 180 (♀). Type locality: Mexico, Chiapas, Chiapa de Corzo. Additional references: Fairchild & Hertig, 1948b: 456 (♂, ♀).

Lutzomyia (Micropygomyia) chiapanensis (Dampf): Young & Duncan, 1994: 637 (keys, references, distribution); Ibáñez-Bernal, 2003: 120 (diagnosis, references).

Micropygomyia (Coquillettimyia) chiapanensis (Dampf): Galati, 2003: 33, 82 (list, keys); Ibáñez-Bernal *et al.*, 2011: 32 (Veracruz records, distribution).

Diagnosis. Male: ejaculatory filaments with simple tips; gonocoxite with a basal tuft of 5 to 7 setae and a median non compact group of no more than 10 setae. Female: cibarium with 16 to 28 horizontal teeth in comb-like row, no lateral teeth; spermathecae nearly spherical with annulated basal portion, spermathecal ducts lightly striated, the individual ducts similar in width throughout (Young & Duncan 1994, Galati 2003).

Material examined. MEXICO: CHIAPAS: Loma Bonita, 16-ii-2010, 1 ♀; 22-iv-2010, 1 ♀. Collected with CDC light traps.

Distribution. MEXICO (Chiapas, Guerrero, Michoacán, Nayarit, Oaxaca, Sonora, Veracruz and Yucatán) (Ibáñez-Bernal *et al.* 2011), EL SALVADOR, HONDURAS, NICARAGUA, COSTA RICA, and PANAMA (Young & Duncan 1994, Galati 2003).

Remarks. This small species apparently has a wide distribution in Mesoamerica. In the present study it was not abundant as compared with other species or geographical areas. Females of this species apparently feed on the blood of lizards.

Subtribe *Lutzomyiina* Abonnenc & Leger, 1976

Lutzomyiina Abonnenc & Leger, 1976b: 357. Type genus: *Lutzomyia* França, 1924 (as *Lutzomyiinae*). Additional references: Galati, 1995: 136; Galati, 2003: 34 (listed).

Diagnosis. Palpal segment 2 as long or longer than 4; Newstead scales forming a patch on middle or sparse on internal edge of palpal segment 3; male antennal flagellomere 1 with the external ascoid originated distad as compared with the internal ascoid; female cibarium variable; thorax with ventro-cervical sensilla, but if not, then with a patch of setae in the anterior portion of katepisternum (Galati 2003).

Remarks. Galati (2003) included the genera *Sciopemyia* Barretto, 1962, *Lutzomyia* França, 1924, *Migonemyia* Galati, 1995, *Pintomyia* Costa Lima, 1932, *Dampfomyia* Addis, 1945, *Expapillata* Galati, 1995, *Pressatia* Mangabeira, 1942, *Trichopygomyia* Barretto, 1962, and *Evandromyia* Mangabeira, 1941, in this subtribe.

***Lutzomyia* França, 1924**

Lutzia França, 1920: 234. Type species: *Phlebotomus longipalpis* Lutz & Neiva (original description, preoccupied by Theobald, 1903 [Culicidae]).

Lutzomyia França, 1924: 10 (as subgenus of *Phlebotomus*, new name for *Lutzia* França). Type species: *Phlebotomus longipalpis* Lutz & Neiva. Additional references: Lewis *et al.*, 1977: 325 (classification); Young & Duncan, 1994: 1 (taxonomy revision); Galati, 1995: 136; Galati, 2003: 34 (listed).

Francaia Dyar & Nuñez-Tovar, 1926-27: 155 (as *Francaia* or *Fransaia*, new name for *Lutzia* França).

Lutzomyia Cordero, Vogelsang & Cossio, 1928: 649 (new name for *Lutzia* França).

Lutziola Strand, 1932: 195 (new name for *Lutzia* França).

Diagnosis. According to Galati (1995), genus *Lutzomyia sensu stricto* is characterized by the following apomorphies: Male flagellomere 1 with apical and basal papillae present; female palpomere 2/ palpus length relation between 0.16–0.19; male gonostylus with the lower external spiniform setae at middle or in basal half; female spermatheca annulated; common spermathecal duct evident but short.

Remarks. According with Lewis *et al.* (1977) and Young & Duncan (1994) the genus *Lutzomyia* includes the New World species of Phlebotominae with the exception of *Warileya* Hertig, 1948, and *Brumptomysia*. Based on a phylogenetic analysis, Galati (1995, 2003) proposed *Lutzomyia* in a strict sense, as in the diagnosis presented above, to include species of the subgenera *Helcochyrtomyia* Barretto, 1962, *Castromyia* Mangabeira, 1942, *Lutzomyia s. str.*, and *Tricholateralis* Galati, 1995.

***Lutzomyia (Lutzomyia)* França, 1924**

Lutzomyia (Lutzomyia) França, 1924: Galati, 1995: 137; Galati, 2003: 36, 70 (listed, key).

Lutzomyia (Aguayoi) Vargas, 1978: 89. Type species: *Lutzomyia dispar* Martins & Silva, 1963).

Diagnosis. Katepisternum without pilosity at anterior margin. Male: basal, mesal area of gonocoxite without sclerotization and with a tuft of no more than 6 setae; gonostylus with two apical spiniform setae, but if only one, a preapical setae may be present and the lateral basal spiniform setae situated basad in relation to the mesal basal one; paramere with one or two setae on base or at middle of the ventral margin (according to the actual position of sclerites), and with apex curved. Female cibarium with complete sclerotized arch and vertical teeth normal orientated or laterally directed; spermathecae annulated, common duct short and individual ducts as long as 4.0 the length of common duct.

Remarks. There are approximately 15 species of this subgenus, nearly all distributed in South America.

***Lutzomyia (Lutzomyia) longipalpis* (Lutz & Neiva, 1912)**

Phlebotomus longipalpis Lutz & Neiva, 1912: 89 (♂, ♀). Type locality: Brazil, locality not specified.

Phlebotomus otamae Nuñez-Tovar, 1924: 44 (♂). Type locality: Venezuela, Carabobo, Isla de Otama.

Phlebotomus almazani Galliard, 1934b: 193 (♀). Type locality: Mexico, Yucatán, Chichen Itzá.

Flebotomus longipalpis: Barretto, 1947a: 208 (full references to that date).

Lutzomyia longipalpis (Lutz & Neiva): Theodor, 1965: 181 (taxonomy); Forattini, 1973: 213 (taxonomy); Martins *et al.*, 1978: 22 (distribution, references); Young, 1979: 56 (figures, references); Ward *et al.*, 1988: 257 (taxonomy, distribution, biology); Young & Duncan, 1994: 56 (references, taxonomy, keys, distribution); Galati, 2003: 36 (listed, keys); Rebollar-

Téllez *et al.*, 2004: 285 (Campeche record); Rebollar-Téllez *et al.*, 2006: 23 (Yucatán record); May-Uc *et al.*, 2011: 279 (Quintana Roo record).

Diagnosis. Flagellomeres with simple ascoids not reaching the apical margin of the flagellomere. Male: Paramere with two specialized long setae on ventral (original, without considering terminalia inversion) margin, not arising from tubercle; gonostylus with preapical seta, and four spiniform setae: one on basal half, one at middle, one at apical one-third, and one apical; gonocoxite with basal tuft composed of four strong long setae; Female: flagellomere 1 about as long as palpal segments 1+2, and slightly shorter than labrum; cibarium with about 8 to 12 horizontal teeth, evenly spaced, and a row of small vertical teeth; spermatheca cylindrical, shorter than 4.0 times its width and with few annulations; individual spermathecal ducts slender, about 6.0X the length of spermatheca (Young & Duncan 1994, Ibáñez-Bernal 1999, Galati 2003).

Material examined. MEXICO: CHIAPAS: Loma Bonita, 14-viii-2009, 1 ♀; 16-v-2010, 1 ♀. Collected with CDC light traps.

Distribution. This nominal species, has been recorded from Mexico to Argentina (Martins *et al.* 1978; Young & Duncan 1994). Ibáñez-Bernal *et al.* (2011) included the current known distribution in Mexico.

Remarks. *Lutzomyia longipalpis* has a wide distribution reaching the southern portion of Mexico, it has been reported as a species complex (Ward *et al.* 1988). In Mexico, as in other Central and South American countries, *Lu. longipalpis* has been collected from areas in which visceral leishmaniasis cases have been reported. This species takes blood meals from a variety of vertebrates including humans.

Lutzomyia (Helcocyrtomyia) Barretto, 1962

Phlebotomus species group *vexator* Fairchild & Hertig, 1957: 325 (species keyed).

Lutzomyia (Helcocyrtomyia) Barretto, 1962: 96 (as subgenus). Type species: *Phlebotomus peruensis* Shannon, original designation). Additional references: Martins *et al.*, 1978: 68; Williams, 1991: 535 (taxonomy, distribution); Artemiev, 1991: 73 (in part); Young & Duncan, 1994: 714 (references, taxonomy revision); Galati, 1995: 136 (phylogenetic analysis); Galati, 2003: 35 (listed, keys).

Phlebotomus species group *sanguinarius* Ortiz, 1965b: 25 (in part).

Lutzomyia species group *vexatrix* Theodor, 1965: 183 (defined); Lewis *et al.*, 1977: 325 (as species group *vexator*).

Lutzomyia (Lutzomyia): Forattini, 1971a: 99 (in part); Forattini, 1973: 212 (in part).

Psychodopygus (Trichophoromyia): Forattini, 1971a: 105 (in part); Forattini, 1973: 416 (in part).

Isolutzomyia Artemiev, 1991: 72 (in part). Type species: *Isolutzomyia cirrita* (Young & Porter), original designation.

Lutzomyia (Sauromyia) Artemiev, 1991: 74 (in part).

Diagnosis. According to the classification of Galati (1995, 2003) subgenus *Helcocyrtomyia* is distinguished from other *Lutzomyia* subgenera (*sensu* Galati) by the following combination of characters: katapisternum with pilosity on anterior margin; tarsomere 3 with spines grouped in 3 or more rows; male gonostylus with two apical spiniform setae; female spermatheca annulated.

Remarks. *Lutzomyia (Helcocyrtomyia)* as defined by Galati (2003) differs from that defined by Young & Duncan (1994) as the latter included species of the species-group *migonei*, *Pintomyia (Pifanomyia)* series *pia*, *Micropygomyia (Coquilletimyia)* series *vexator*, series *chiapanensis*, and a few ungrouped species. Currently there are approximately 36 species belonging to 3 series; *sanguinaria*, *osornoi* and *peruensis* (Galati 2003). In this study we collected one species of series *sanguinaria*.

Lutzomyia (Helcocyrtomyia) hartmanni (Fairchild & Hertig, 1957)

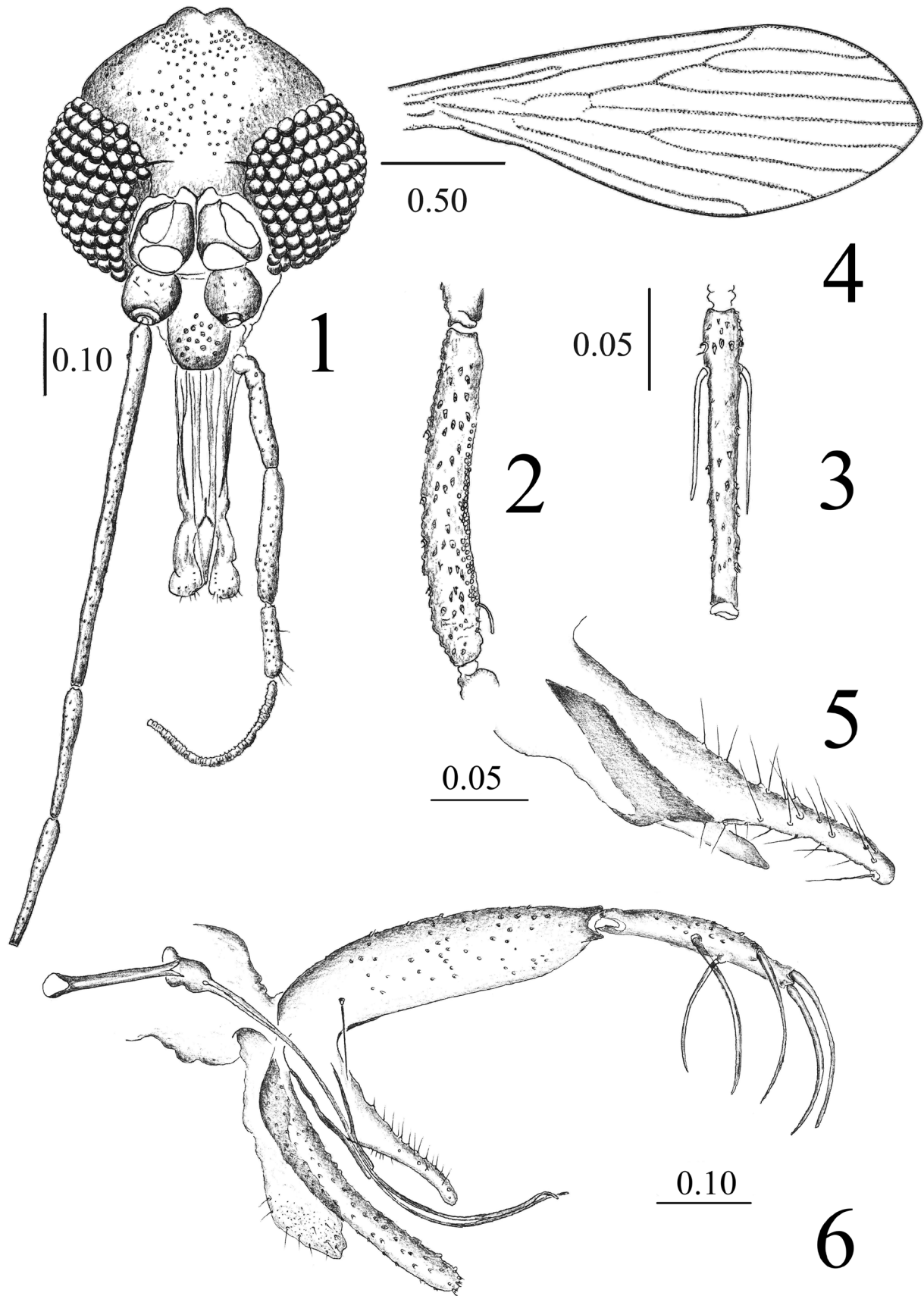
(Figures 1–6)

Phlebotomus hartmanni Fairchild & Hertig, 1957: 328 (♂, ♀). Type locality: Panama, Cerro Campana.

Lutzomyia hartmanni (Fairchild & Hertig): Barretto, 1962: 96 (listed); Martins *et al.*, 1978: 79 (references, distribution); Young, 1979: 199 (references, figures); Morales *et al.*, 1981: 201 (Colombia); Christensen *et al.*, 1983: 466 (Panama); Young & Rogers, 1984: 599 (Ecuador); Murillo & Zeledón, 1985: 99 (Costa Rica); Alexander *et al.*, 1992a: 37 (Ecuador).

Psychodopygus hartmanni (Fairchild & Hertig): Forattini, 1971a: 105; Forattini, 1973: 466 (taxonomy).

Lutzomyia (Helcocyrtomyia) hartmanni (Fairchild & Hertig): Young & Duncan, 1994: 728 (taxonomy, references, distribution); Galati, 2003: 35 (listed as series *sanguinaria*, keys).



FIGURES 1–6. *Lutzomyia (Helcocyrtomyia) hartmanni* (Fairchild & Hertig, 1957), male. 1) Head, frontal view; 2) Palpal segment 3, right; 3) Flagellomere 2; 4) Wing; 5) Paramere; 6) Terminalia, lateral view. Scales in millimeters.

Diagnosis. Clypeus at most 0.3 times the length head. Male: gonocoxite with a basal tuft of 1 to 4 setae, of which one is large and the other if present very small; nearly all specimens observed from Mexico has only the large setae; gonostylus with the internal spiniform setae originated at middle of structure; wing with delta small or similar than 0.33 the alpha length; diameter of the basal apex of ejaculatory apodeme about 4.0 times the diameter of ejaculatory apodeme at middle; lateral lobe shortest than gonocoxite. Female: palpal segment 5 as long or shortest than 1.25 the length of 3 segment; spermatheca thin, the apical annulus as wide as the preceding one; individual spermathecal ducts longer than spermatheca (Galati 2003).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 12-viii-2009, 2 ♂; 18-ii-2010, 2 ♂; 19-iii-2010, 3 ♂; 20-iv-2010, 3 ♂; 22-iv-2010, 2 ♂; 11-v-2010, 1 ♂; 12-v-2010, 10 ♂; 15-v-2010, 1 ♂; 13-v-2010, 3 ♂; 21-iv-2010, 1 ♀; 11-v-2010, 1 ♀; 12-v-2010, 2 ♀; 15-vi-2010, 1 ♂; 11-viii-2010, 6 ♂; 20-x-2010, 1 ♂; 16-xi-2010, 3 ♂; 17-xi-2010, 1 ♂; 02-xii-2010, 2 ♂; 19-i-2011, 1 ♂; 20-i-2011, 1 ♂; 08-ii-2011, 1 ♂; 15-iii-2011, 1 ♂. Loma Bonita, 16-i-2010, 2 ♀; 19-ii-2010, 1 ♀; 20-iii-2010, 1 ♂. Collected with CDC light traps.

Distribution. COSTA RICA, PANAMA, COLOMBIA, ECUADOR, and PERU (Galati 2003). This is the first record in MEXICO.

Remarks. One specimen from Guadalupe Miramar, show a teratology in the gonostylus as it presents two median setae, so the spiniform setae formula of gonostylus is 2+ 1+ 2+ 1 in both sides. All other diagnostic characters correspond to *Lu. (Hel.) hartmanni*. Females of this species are anthropophilous.

Lutzomyia (Tricholateralis) Galati, 1995

Lutzomyia species group *cruciata*: Theodor, 1965: 181; Martins *et al.*, 1978: 120.

Lutzomyia (Helcocyrtomyia) species group *cruciata*: Artemiev, 1991: 73.

Lutzomyia (Lutzomyia): Young & Duncan, 1994: 45 (in part).

Tricholateralis Galati, 1995: 136 (as subgenus of *Lutzomyia*). Type species: *Lutzomyia cruciata* (Coquillett, 1907). Additional references: Galati, 2003: 36 (listed, keys).

Diagnosis. Flagellomere 3 without sensorial papilla; abdominal pleura with small setae. Male: gonostylus with one apical spiniform setae and without preapical setae. Female: spermatheca annulated (Galati 2003).

Remarks. This subgenus includes species which females usually feed on human blood as well as on other vertebrates, and some species have been incriminated or associated as possible vectors of *Leishmania* to humans (Young & Duncan 1994). According to Galati (2003) 12 species are included in this subgenus, with three of them distributed in Mexico.

Lutzomyia (Tricholateralis) cruciata (Coquillett, 1907)

Flebotomus cruciatus Coquillett, 1907: 102 (♀). Type locality: Guatemala, Alta Vera Paz, Trece Aguas, Cacao.

Lutzomyia (Lutzomyia) cruciata (Coquillett): Young & Duncan, 1994: 67 (taxonomy, references between 1947 and 1994, keys); Ibáñez-Bernal, 1999: 78 (diagnosis, references, distribution); Rebollar-Téllez & Manrique-Saide, 2001: 337 (Yucatán records); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records); Rebollar-Téllez *et al.*, 2005: 197 (Campeche abundance data); Rebollar-Téllez *et al.*, 2006: 23 (Yucatán records); Pech-May *et al.*, 2010: 150 (infection rates in Campeche); Sánchez-García *et al.*, 2010: 406 (infection rates in Quintana Roo); González *et al.*, 2011: 839 (geographical distribution); Méndez-Pérez & Rebollar-Téllez, 2012: 7 (morphological studies); Pérez *et al.*, 2014: 82 (Chiapas records at coffee plantations); Pech-May *et al.*, 2013: 254 (population genetics study).

Lutzomyia (Tricholateralis) cruciata (Coquillett): Galati, 2003: 36, 93, 94 (list, keys); Ibáñez-Bernal *et al.*, 2011: 33 (Veracruz records).

Diagnosis. Pronotum and paratergite dark, similar to mesonotum strongly contrasting with the rest of pale pleura. Male: gonocoxite with basal tuft sessile, formed by 12 or more setae; paramere simple with apical half straight. Female: cibarium usually with 4 horizontal teeth; tergum 9 with stout multiple setae in the antero-lateral corner; spermatheca with terminal annulus larger than the preceding annuli; individual spermathecal ducts longer than spermatheca (Young & Duncan 1994, Galati 1995, 2003).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 21-x-2009, 1 ♀; 20-iv-2010, 1 ♂; 14-v-2010, 1 ♂; 14-i-2010, 1 ♀; 17-ii-2010, 1 ♀; 18-ii-2010, 1 ♀; 17-iii-2010, 1 ♀; 24-iv-2010, 1 ♀; 19-iii-2010, 2 ♀; 20-iv-

2010, 1 ♀; 16-vi-2010, 1 ♀; 08-vii-2010, 1 ♀; 23-i-2011, 1 ♀; 08-ii-2011, 1 ♀; 09-ii-2011, 1 ♀. Loma Bonita, 24-iv-2009, 2 ♀; 22-x-2009, 1 ♀; 15-i-2010, 1 ♀; 16-i-2010, 2 ♀; 17-i-2010, 1 ♀; 19-ii-2010, 1 ♀; 19-ii-2010, 1 ♀; 19-ii-2010, 2 ♀; 20-iii-2010, 3 ♂, 20 ♀; 21-iii-2010, 5 ♀; 22-iii-2010, 2 ♀; 23-iv-2010, 1 ♀; 24-iv-2010, 1 ♀; 14-v-2010, 1 ♀; 16-v-2010, 1 ♀; 19-vi-2010, 2 ♀; 20-v-2010, 1 ♀; 19-vi-2010, 1 ♂; 15-viii-2010, 2 ♀; 24-x-2010, 1 ♂; 22-i-2011, 2 ♀; 18-iii-2011, 1 ♂, 1 ♀; 20-vii-2011, 1 ♀. San Antonio Buena Vista, 15-vii-2009, 1 ♂; 17-x-2009, 1 ♂; 11-xi-2009, 1 ♂; 17-iv-2010, 10 ♀; 18-v-2010, 2 ♂; 19-v-2010, 5 ♂; 20-v-2010, 1 ♂; 11-vi-2010, 1 ♂; 12-vi-2010, 1 ♂; 13-vii-2010, 2 ♂; 14-vii-2010, 1 ♂; 08-xii-2010, 2 ♂; 20-v-2010, 5 ♀; 13-vii-2010, 1 ♀; 20-x-2010, 1 ♀; 27-x-2010, 1 ♀. Tziscaco, 06-viii-2009, 2 ♀; 13-x-2009, 2 ♀; 14-x-2009, 1 ♀; 15-iv-2010, 1 ♀; 21-v-2010, 3 ♀; 22-v-2010, 4 ♀; 08-vi-2010, 5 ♀; 09-vi-2010, 1 ♀; 10-vi-2010, 1 ♀; 27-x-2010, 1 ♀; 11-xi-2010, 2 ♀. Collected with CDC light traps.

Additional material collected with Magoon traps: MEXICO: CHIAPAS: Guadalupe Miramar, 13-viii-2009, Magoon trap, 1 ♀. Loma Bonita, 16-ii-2010, 1 ♀; 18-ii-2010, 1 ♀; 19-ii-2010, 1 ♀; 20-ii-2010, 1 ♀; 18-iii-2010, 2 ♀; 20-iv-2010, 1 ♀; 23-iv-2010, 1 ♀; 15-v-2010, 1 ♀; 12-ii-2011, 2 ♀; 15-iii-2011, 1 ♀; 16-iii-2011, 3 ♀; 18-iii-2011, 2 ♀. San Antonio Buena Vista, 12-vi-2009, 1 ♀; 27-iii-2010, 1 ♀; 16-vii-2010, 1 ♀. Tziscaco, 13-x-2009, 2 ♀.

Distribution. USA, MEXICO (Campeche, Chiapas, Guerrero, Hidalgo, Jalisco, Morelos, Nayarit, Nuevo León, Oaxaca, Puebla, Quintana Roo, San Luis Potosí, Tabasco, Tamaulipas, Veracruz, Yucatán), BELIZE, GUATEMALA, HONDURAS, EL SALVADOR, NICARAGUA, COSTA RICA, PANAMA (Young & Duncan 1994; Ibáñez-Bernal 1999).

Remarks. *Lutzomyia cruciata* has been reported biting a great number of vertebrate hosts including humans, and collected nearly in all parts of Mexico where human cutaneous leishmaniasis cases have been recorded (González *et al.* 2011). Pech-May *et al.* (2010) and Sánchez-García *et al.* (2010) reported natural infection with *Leishmania mexicana* in the Mexican states of Campeche and Quintana Roo, respectively. There are also records of infection with *Wolbachia* (Mikery-Pacheco *et al.* 2012). With the exception of *Psathyromyia shannoni* (Dyar), this species is the most widely distributed sand fly species in Mexico (Pérez *et al.* 2014). Specimens of *Lu. cruciata* exhibit minor morphological differences throughout the species' range (Méndez-Pérez & Rebollar-Téllez 2012), and Pech-May *et al.* (2013) found high genetic variability with at least three lineages. This morphospecies was the third most abundant in our collections.

***Pintomyia* Costa Lima, 1932**

Phlebotomus (*Pintomyia*) Costa Lima, 1932: 44. Type species: *Phlebotomus fischeri* Pinto, by original designation.

Phlebotomus species group *triacanthus* Fairchild, 1955: 194 (series *fischeri*).

Lutzomyia (*Pintomyia*) Costa Lima: Barretto, 1962: 92; Theodor, 1965: 192; Lewis *et al.*, 1977: 325; Martins *et al.*, 1978: 25; Young & Duncan, 1994: 269.

Pintomyia (as genus): Forattini, 1971a: 103; Forattini, 1973: 497; Artemiev, 1991: 73; Galati, 1995: 137; Galati, 2003: 37.

Diagnosis. Antennal flagellomere 1 as long as or longer than one-half the head length. Male: paramere simple, without preapical angular protuberance in ventral margin; gonocoxite with a basal-internal sclerotization; gonostylus with pre-apical setae; lateral lobe slightly slenderer than gonocoxite and with rounded apex. Female: tergum VIII usually with setae; spermathecal common duct as long that reach or surpass the middle of the furca's trunk (Galati 2003).

Remarks. Galati (1995, 2003) recognized two subgenera, *Pintomyia* (*Pintomyia*) with species distributed primarily in South America and one species as far north as Panama in Central America, and *Pintomyia* (*Pifanomyia*) Ortiz & Scorza, a widely distributed and species-rich subgenus, with species known from Mexico to Argentina and representatives in the area surveyed in our study.

***Pintomyia* (*Pifanomyia*) Ortiz & Scorza, 1963**

Phlebotomus (*Pifanomyia*) Ortiz & Scorza, 1963: 344. Type species: *Phlebotomus serranus* Damasceno & Causey, by original designation.

Lutzomyia species group *verrucarum*: Theodor, 1965: 183 (defined); Lewis *et al.*, 1977: 325; Martins *et al.*, 1978: 124 (in part, defined); Feliciangeli *et al.*, 1992: 729; Young & Duncan, 1994: 171.

Lutzomyia (Lutzomyia) (in part): Forattini, 1973: 212.

Pintomyia (Pifanomyia) Ortiz & Scorza: Galati, 1995: 137; Galati, 2003: 37.

Diagnosis. *Pi. (Pifanomyia)* includes species which differs from *Pi. (Pintomyia)* by the absence of spines on hind femur and the non-sclerotized spermathecal individual ducts at base of spermathecae (Galati 2003).

Remarks. Galati (2003) recognized seven series: *pacae* Galati, 1995, *monticola* Artemiev, 1991, *pia* Galati, 1995, *verrucarum* Fairchild, 1955, *evansi* Galati, 1995, *serrana* Barretto, 1962, and *townsendi* Galati, 1995, with about 50 species (Galati 2003), nearly all distributed in South America, but with series *serrana* and *evansi* including species recorded in Mexico.

***Pintomyia (Pifanomyia) ovallesi* (Ortiz, 1952) (series *evansi*)**

Phlebotomus ovallesi Ortiz, 1952: 155 (♂). Type locality: Venezuela, Lara, Duaca. Additional references: Lewis & Garnham, 1959: 87 (♀, Belize record).

Lutzomyia ovallesi (Ortiz): Barretto, 1962: 98 (listed); Mogollon *et al.*, 1977: 209 (Venezuela record); Martins *et al.*, 1978: 128 (references, distribution); Young, 1979: 84 (Colombia record); Feliciangeli, 1980: 246 (in keys); Murillo & Zeledón, 1985: 75 (Costa Rica record); Feliciangeli, 1988: 108 (distribution in Venezuela); Rowton *et al.*, 1991: 501 (Belize and Mexico records; natural infections with *Leishmania* in Guatemala); Feliciangeli *et al.*, 1992: 735 (taxonomy revision); Young & Duncan, 1994: 186 (references, taxonomy, keys, distribution, figures); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records), Rebollar-Téllez *et al.*, 2005: 197 (Campeche abundance data); May-Uc *et al.*, 2011: 279 (Quintana Roo records), Pérez *et al.*, 2014: 82 (Chiapas records at coffee plantations).

Pintomyia (Pifanomyia) ovallesi (Ortiz): Galati, 2003: 38 (listed, keys).

Diagnosis. Antennal flagellomeres with simple ascoids. Palpal segment 5, as long as or longer than the sum of segments 3+4. Male: Gonocoxite with basal tuft of long setae; gonostylus as long as 0.4 the gonocoxite length, with one apical, one preapical and two median (at same level) spiniform setae, additionally with preapical delicate seta; paramere simple, with short setae on distal one-third, and slightly broadened rounded apex; lateral lobe longer than 7.5 times its width. Female: Cibarium with four horizontal teeth, a row of about 8 vertical teeth and few lateral teeth in compact group; spermatheca striated with a median constriction (Young & Duncan 1994).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 12-v-2010, 1 ♂; 13-v-2010, 1 ♂; 02-ii-2011, 1 ♀; 20-iv-2010, 1 ♀; 13-v-2010, 1 ♀; 20-i-2011, 1 ♀.

Loma Bonita, 06-ix-2009, 2 ♂; 22-x-2009, 1 ♀; 15-i-2010, 1 ♀; 16-i-2010, 4 ♀; 17-i-2010, 1 ♀; 16-ii-2010, 2 ♀; 19-ii-2010, 4 ♂, 12 ♀; 20-ii-2010, 2 ♂, 4 ♀; 21-ii-2010, 4 ♀; 18-iii-2010, 1 ♀; 20-iii-2010, 3 ♂, 115 ♀; 21-iii-2010, 2 ♀; 22-iii-2010, 1 ♂, 2 ♀; 24-iv-10, 1 ♀; 12-v-2010, 1 ♀; 14-v-2010, 1 ♂, 2 ♀; 15-v-2010, 1 ♂; 16-v-2010, 2 ♂, 3 ♀; 23-x-2010, 1 ♂; 19-xi-2010, 4 ♂; 21-xi-2010, 1 ♂; 21-i-2011, 1 ♀; 22-i-2011, 2 ♀; 18-iii-2011, 1 ♂, 1 ♀; 19-iii-2011, 4 ♀; 20-iii-2011, 1 ♀. San Antonio Buena Vista: 17-iv-2010, 1 ♀; 18-v-2010, 1 ♂. Specimens collected with CDC light traps.

Additional material collected with Magoon Traps. MEXICO: CHIAPAS: Loma Bonita, 10-xii-2009, 1 ♀; 18-ii-2010, 14 ♀; 19-ii-2010, 6 ♀; 20-ii-2010, 1 ♀; 18-iii-2010, 1 ♀; 20-iv-2010, 2 ♀; 22-iv-2010, 2 ♀; 17-xi-2010, 1 ♀; 19-i-2011, 3 ♀; 12-ii-2011, 1 ♀; 18-iii-2011, 1 ♀.

Distribution. MEXICO (Campeche, Chiapas, Quintana Roo), BELIZE, GUATEMALA, HONDURAS, COSTA RICA, NICARAGUA, PANAMA, COLOMBIA, TRINIDAD, VENEZUELA (Young & Duncan 1994, Galati 2003).

Remarks. This species was the second most abundant during collections and showed anthropophilous habits.

***Pintomyia (Pifanomyia) serrana* (Damasceno & Arouck, 1949) (series *serrana*)**

Flebotomus serranus Damasceno & Arouck, 1949: 843 (♂). Type locality: Brazil, Pará, Serra de Piriabas.

Phlebotomus guayasi Rodríguez, 1956: 76 (♂, ♀). Type locality: Ecuador, Guayas. Additional references: Fairchild & Hertig, 1961: 237 (as synonym of *Ph. serranus*).

Lutzomyia serrana (Damasceno & Arouck) (species-group *Verrucarum*): Young & Duncan, 1994: 177 (references, keys, distribution); Ibáñez-Bernal, 1999: 103 (diagnosis, references, distribution).

Pintomyia (Pifanomyia) serrana (Damasceno & Arouck): Galati, 2003: 38, 99, 100 (list, keys); Ibáñez-Bernal *et al.*, 2011: 34 (Veracruz records).

Diagnosis. Antennal flagellomeres with simple ascoids. Palpal segment 5, as long as or longer than the sum of segments 3+4. Male: Gonocoxite with basal tuft of stout simple, apically curved setae, in transversal row; gonostylus with three spiniform setae of which the apical and preapical one are robust, and the median one at middle is slender; additionally there is a preapical delicate seta; paramere simple broad with short setae on distal one-half; Female: Cibarium with four horizontal teeth, a row of about 8 vertical teeth and few lateral teeth in compact group; Spermatheca pyriform, with a globular apical portion well differentiated from basal annuli; spermathecal common duct longer than 3.0 times the length of spermatheca, individual ducts similar to spermatheca length (Young & Duncan 1994).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 14-i-2010, 4 ♀; 20-iv-2010, 1 ♀; 13-v-2010, 1 ♀; 24-v-2011, 1 ♂; 20-i-2011, 2 ♀; 09-ii-2011, 1 ♀. Loma Bonita, 15-i-2010, 1 ♀; 19-ii-2010, 1 ♂, 2 ♀; 20-iii-2010, 2 ♀; 14-v-2010, 1 ♀; 16-v-2010, 1 ♀; 24-x-2010, 1 ♀. San Antonio, 11-vi-2010, 1 ♀; 19-v-2010, 1 ♀. Specimens collected with CDC light traps.

Distribution. MEXICO (Campeche, Chiapas, Nayarit, Veracruz) (Ibáñez-Bernal *et al.* 2011), BELIZE, GUATEMALA, HONDURAS, NICARAGUA, COSTA RICA, PANAMA, COLOMBIA, VENEZUELA, FRENCH GUYANA, BRAZIL, ECUADOR, PERU, BOLIVIA (Young & Duncan 1994, Galati 2003).

Remarks. This species was collected with CDC light traps mainly in ever green forest and coffee plantations surrounded by jungle.

***Dampfomyia* Addis, 1945**

Phlebotomus (Dampfomyia) Addis, 1945: 120. Type-species: *Phlebotomus anthophorus* Addis (original designation).

Additional references: Fairchild & Hertig, 1956: 307 (review).

Lutzomyia (Dampfomyia) Addis: Barretto, 1962: 95 (diagnosis); Theodor, 1965: 193; Martins *et al.*, 1978: 57; Artemiev, 1991: 74 (listed); Young & Duncan, 1994: 249 (diagnosis, key, distribution).

Phlebotomus (Anthophorus) De León, 1971: 187 (*sic!*).

Dampfomyia Addis (as genus): Galati, 1995: 137; Galati, 2003: 39 (listed).

Diagnosis. Antenna with flagellomere 1 longer than one-half the length of head, with simple ascoids; eyes small; palpomere 5 longer than 3+4; katapisternum without setae near anterior margin; abdominal terga without papillae. Male: Paramere simple, nearly always with a triangular median protuberance on dorsal margin, and with a specialized setose lobe near base on ventral margin (not considering the terminalia inversion); gonocoxite with the internal basal surface strongly sclerotized and without basal tuft of persistent setae; gonostylus with one apical strong spiniform setae and a preapical fine seta. Female: cibarium with 4 to 6 horizontal teeth, with complete arch; pharynx unarmed; spermatheca not completely ringed, with bubble-like evaginations; spermathecal individual ducts not longer than 2.5 times the length of common duct (Galati 2003, Young & Duncan 1994).

Remarks. According to Galati (1995, 2003) this genus incorporates *Coromyia* Barretto, the species group *delpozoi* and *Dampfomyia* as previously recognized in Young & Duncan's (1994) classification.

***Dampfomyia (Coromyia)* Barretto, 1962**

Lutzomyia (Coromyia) Barretto, 1962: 97. Type species: *Phlebotomus vespertilionis* Fairchild & Hertig, 1947 (original designation). Additional references: Forattini, 1971: 101 (in part); Forattini, 1973: 273 (in part); Martins *et al.*, 1978: 88 (list); Artemiev, 1991: 74 (in part); Young & Duncan, 1994: 227 (redefined, key, distribution); Ibáñez-Bernal, 2001: 18 (Mexican species).

Lutzomyia (Dampfomyia) Addis, 1945 (in part): Forattini, 1971: 100; Forattini, 1973: 329.

Lutzomyia species group *vespertilionis*: Theodor, 1965: 183; Lewis *et al.*, 1977: 325; Young, 1979: 88.

Dampfomyia (Coromyia) Barretto: Galati, 1995: 137; Galati, 2003: 39 (list, keys).

Diagnosis. In addition to the *Dampfomyia* characteristics already presented, males have lateral lobe markedly inflated with parameres simple and gonostylus with 2 to 4 spiniform setae and a preapical delicate seta, and female cibarium armature with 4 horizontal teeth, variable number of vertical teeth and lateral teeth, complete arch, and spermathecae sac-like with short and broad ducts or highly modified with accessory sacs (Young & Duncan 1994; Galati 2003).

Remarks. This is predominantly a Mesoamerican taxon, with one Nearctic species and two species reaching the northern portion of South America. In the area of study, we found four species. Currently, it is not possible to separate females of *Da. beltrani* (Vargas & Díaz-Nájera, 1951), *Da. disneyi* (Williams, 1987) and *Da. steatopyga* (Fairchild & Hertig, 1958), and also we noticed that spermathecae in the slides of *Da. deleoni* (Fairchild & Hertig, 1947) were not always visible, for this reason we present the female specimens of *Dampfomyia* (*Coromyia*) as undetermined, considering that the four species are sympatric in the sampled localities.

***Dampfomyia* (*Coromyia*) *beltrani* (Vargas & Díaz-Nájera, 1951)**

Phlebotomus beltrani Vargas & Díaz-Nájera, 1951: 101 (♂). Type locality: Mexico, Veracruz, San Andrés Tuxtla, Cueva del Diablo. Additional references: Fairchild & Hertig, 1958: 512 (♂, ♀).

Lutzomyia (*Coromyia*) *beltrani* (Vargas & Díaz-Nájera): Young & Duncan, 1994: 231 (taxonomic history, ♂ and ♀ figures, keys); Ibáñez-Bernal, 2001: 18 (revision ♂, ♀; distribution); Ibáñez-Bernal, 2005a: 51, 54 (Mexican distribution, ♂ taxonomic key); Ibáñez-Bernal, 2005b: 208 (♀ taxonomic key); Montes de Oca-Aguilar *et al.*, 2013a; 241, 2013b: 191 (Yucatán records and ecological data).

Dampfomyia (*Coromyia*) *beltrani* (Vargas & Díaz-Nájera): Galati, 2003: 39, 103 (listed, taxonomic keys); Ibáñez-Bernal *et al.*, 2011: 34 (Veracruz records); Montes de Oca-Aguilar *et al.*, 2014: 251 (immature stages descriptions).

Diagnosis. Male: gonocoxite and gonostylus slightly longer than lateral lobe; gonostylus with one basal thin spiniform seta that seems like a simple setae, median spiniform seta strong originated in the apical third and nearly as broad as apical spiniform seta; lateral lobe length more than 6.0 times its width. Female: cibarium with 4 horizontal teeth radially disposed, few vertical teeth and numerous lateral teeth; common spermathecal duct broad, no more than 2.0 times as long as wide, individual spermathecal ducts shorter than common duct or spermatheca; spermathecae barrel-shaped (Young & Duncan 1994).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 25-x-2009, 1 ♂; 16-ii-2010, 1 ♂; 22-iv-2010, 1 ♂; 12-v-2010, 1 ♂; 15-vi-2010, 1 ♂. Loma Bonita, 28-iv-2011, 1 ♂. Specimens collected with CDC light traps.

Distribution. MEXICO (Chiapas, Veracruz, Quintana Roo, Yucatán) (Ibáñez-Bernal, 2005a; Montes de Oca-Aguilar *et al.* 2013a, b), HONDURAS (Young & Duncan 1994, Galati 2003).

Remarks. Female characteristics are so similar and do not help to separate *Da. beltrani* from those of *Da. disneyi* and *Da. steatopyga*, species which are present in the study areas as confirmed with male specimens or by previous records. Females of this species are not anthropophilous, but may be feeding on the blood of bats or rodents.

***Dampfomyia* (*Coromyia*) *deleoni* (Fairchild & Hertig, 1947)**

Phlebotomus deleoni Fairchild & Hertig, 1947b: 622 (♂, ♀). Type locality: Guatemala, Petén.

Lutzomyia (*Coromyia*) *deleoni* (Fairchild & Hertig): Young & Duncan, 1994: 229 (references, keys, distribution); Williams, 1999: 470 (distribution pattern); Ibáñez-Bernal, 2001: 23 (diagnosis, references, distribution); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records), Rebollar-Téllez *et al.*, 2006: 23 (Yucatán records); May-Uc *et al.*, 2011: 279 (Quintana Roo records).

Dampfomyia (*Coromyia*) *deleoni* (Fairchild & Hertig): Galati, 2003: 39, 103 (list, keys); Ibáñez-Bernal *et al.*, 2011: 34 (Veracruz records).

Diagnosis. In addition to the characters mentioned for genus and subgenus, the male of *Da. deleoni* has the gonocoxite with a basal tuft of more than 10 simple curved setae; gonostylus with four spiniform setae disposed at different levels and with preapical seta; paramere slender and curved, with a dorsal (without considering terminalia inversion) triangular projection on the apical third, and lateral lobe as long as 5.0 times its width. Female: spermatheca with a large bladder-like lateral expansion (Young & Duncan 1994).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 17-ii-2010, 1 ♂; 18-ii-2010, 2 ♂; 19-iii-2010, 1 ♂; 20-iv-2010, 1 ♂; 21-iv-2010, 1 ♂; 22-iv-2010, 1 ♂; 12-v-2010, 4 ♂; 19-x-2010, 1 ♂; 10-ii-2011, 1 ♂; 15-iii-2011, 1 ♂. Loma Bonita, 02-ix-2009, 1 ♂; 21-ii-2010, 2 ♂; 22-ii-2010, 1 ♂; 16-v-2010, 4 ♂; 19-vi-2010, 2 ♂; 20-vi-2010, 1 ♂; 21-xi-2010, 1 ♂; 03-xii-2010, 1 ♂; 12-ii-2011, 1 ♂. San Antonio, 17-iv-2010, 1 ♂. Specimens collected with CDC light traps.

Distribution. MEXICO (Campeche, Chiapas, Quintana Roo, Yucatan, Veracruz) (Ibáñez-Bernal 2005a; Montes de Oca-Aguilar *et al.* 2013a), GUATEMALA, BELIZE, HONDURAS, EL SALVADOR, COSTA RICA (Young & Duncan 1994).

Remarks. Female *Da. deleoni* cannot be separate from females of *Da. vescifera* and *Da. zeledoni*, both species recorded in Central America, but not known in Mexico. Records of series *deleoni* species must be confirmed correlating the males because the three species usually are sympatric. Females of this species are not anthropophilous, and may be feed on the blood of bats or rodents.

Dampfomyia (Coromyia) disneyi (Williams, 1987)

(Figures 7–11)

Lutzomyia (Coromyia) disneyi Williams, 1987: 525 (♂, ♀). Type locality: Belize, Cayo District, San Antonio. Additional references: Young & Duncan, 1994: 231 (taxonomy, geographical records, figures); Ibáñez-Bernal, 2001b: 373 (Toledo record, Belize).

Lutzomyia beltrani (Belize form): Williams, 1976a: 595 (taxonomy, figures); Williams, 1976b: 601.

Dampfomyia (Coromyia) disneyi (Williams): Galati, 2003: 39, 103 (list, keys).

Diagnosis. Male: lateral lobe at most four times its maximum width; gonostylus with two strong spiniform setae, separated by more than 4 times the width of terminal spiniform seta, one basal thin setae and with preapical delicate seta; paramere with seate restricted to apical third, without angular dorsal projection (not considering terminalia inversion). Genital filaments shorter than 3.0 times the length of pump. Female: cibarium armature with 4 horizontal teeth, variable number of vertical teeth and lateral teeth, arch complete; spermathecal common duct broad, not more than two times as long as wide, individual ducts shorter than common duct or spermathecae (Young & Duncan 1994).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 01-ix-2009, 1 ♂; 23-x-2009, 2 ♂; 08-xi-2009, 1 ♂; 18-ii-2010, 1 ♂; 19-iii-2010, 2 ♂; 11-viii-2010, 1 ♂; 18-xi-2010, 5 ♂; 24-v-2011, 1 ♂; 07-vi-2011, 1 ♂. Loma Bonita, 20-ii-2010, 1 ♂.

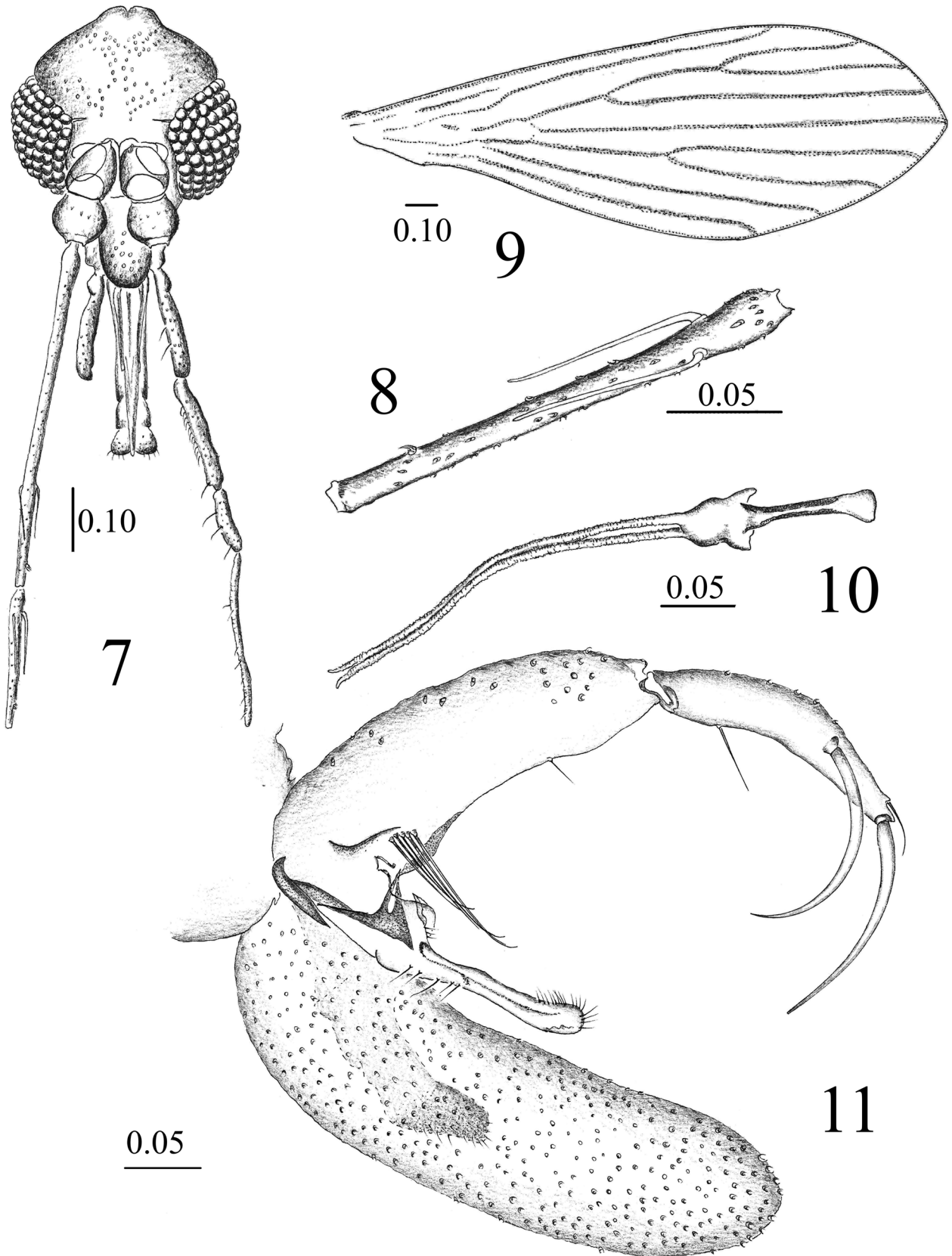
Distribution. BELIZE, GUATEMALA (Young & Duncan 1994; Galati 2003), and now MEXICO (Chiapas).

Remarks. The male is similar to *Da. beltrani*, but can be separated by the wider lateral lobe. The female of this species cannot be differentiated from those of *Da. beltrani* and *Da. steatopyga*. This is the first record of *Da. disneyi* in Mexico. Females of this species are not anthropophilous, but may feed bat or rodent blood.

Unidentified females of *Dampfomyia (Coromyia)*

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 09-xii-2009, 1 ♀; 10-xii-2009, 4 ♀; 13-i-2010, 1 ♀; 14-i-2010, 5 ♀; 16-ii-2010, 4 ♀; 17-ii-2010, 2 ♀; 18-ii-2010, 4 ♀; 17-iii-2010, 8 ♀; 18-iii-2010, 2 ♀; 19-iii-2010, 7 ♀; 20-iv-2010, 4 ♀; 21-iv-2010, 4 ♀; 22-iv-2010, 2 ♀; 24-iv-2010, 1 ♀; 11-v-2010, 1 ♀; 13-v-2010, 6 ♀; 08-vii-2010, 2 ♀; 10-viii-2010, 1 ♀; 14-viii-2010, 2 ♀; 21-x-2010, 2 ♀; 17-xi-2010, 1 ♀; 30-xi-2010, 1 ♀; 02-xii-2010, 2 ♀; 04-xii-2010, 2 ♀; 20-i-2011, 3 ♀; 08-ii-2011, 4 ♀; 10-ii-2011, 1 ♀; 15-iii-2011, 1 ♀; 16-iii-2011, 3 ♀. Loma Bonita, 11-vii-2009, 1 ♀; 15-i-2010, 2 ♀; 16-i-2010, 6 ♀; 17-i-2010, 1 ♀; 16-ii-2010, 1 ♀; 18-ii-2010, 1 ♀; 19-ii-2010, 9 ♀; 20-ii-2010, 6 ♀; 21-ii-2010, 11 ♀; 20-iii-2010, 28 ♀; 21-iii-2010, 3 ♀; 22-iii-2010, 9 ♀; 21-iv-2010, 1 ♀; 22-iv-2010, 1 ♀; 23-iv-2010, 2 ♀; 24-iv-2010, 2 ♀; 14-v-2010, 3 ♀; 16-v-2010, 4 ♀; 19-vi-2010, 1 ♀; 15-viii-2010, 2 ♀; 17-xi-2010, 1 ♀; 22-i-2011, 3 ♀; 13-ii-2011, 1 ♀. San Antonio Buena Vista, 25-iii-2010, 1 ♀. Collected with CDC light traps.

Additional material collected with Magoon trap. MEXICO: CHIAPAS: Guadalupe Miramar, 17-ii-2010, 1 ♀; 07-vii-2010, 1 ♀. Loma Bonita, 11-xii-2009, 1 ♀; 23-iv-2010, 1 ♀.



FIGURES 7–11. *Dampfomyia (Coromyia) disneyi* (Williams, 1987), male. 7) Head, frontal view; 8) Flagellomere 2; 9) Wing; 10) Aedeagus (apodeme, pump and ejaculatory filaments); 11) Terminalia, lateral view. Scales in millimeters.

***Dampfomyia delpozoi* (Vargas & Díaz-Nájera, 1953) (species group *delpozoi*)**

Phlebotomus del-pozoi Vargas & Díaz-Nájera, 1953a: 42 (♂, ♀). Type-locality: Mexico, Chiapas, Mariscal.

Lutzomyia delpozoi (Vargas & Díaz-Nájera): Theodor, 1965: 196; Young & Duncan, 1994: 243 (as species group *delpozoi*; taxonomy, keys, figures); Ibáñez-Bernal, 2001a: 29 (type specimens review, figures); Ibáñez-Bernal, 2005a: 51, 54 (records, male key); Ibáñez-Bernal, 2005b: 202 (female key).

Pressatia delpozoi (Vargas & Díaz-Nájera): Forattini, 1971a: 106; 1973: 515 (figs.).

Dampfomyia delpozoi (Vargas & Díaz-Nájera) species group *delpozoi*: Galati, 2003: 39, 102 (list, keys).

Diagnosis. Male: Gonocoxite shortest than lateral lobe, basally with a modified robust setae and internally with sclerotization; gonostylus with 4 spiniform setae all situated at different levels, the basal one in basal third; preapical fine seta present; paramere with acute apex and with lateral fold, without acute projection in dorsal margin (not considering the terminalia inversion). Female: without characters to separate from other species of this species-group (Galati 2003, Young & Duncan 1994).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 09-xii-2009, 1 ♀; 22-iv-2010, 1 ♀; 12-v-2010, 1 ♂; 13-viii-2010, 1 ♀; 08-ii-2011, 1 ♀; 16-iii-2011, 1 ♀; 17-iii-2011, 2 ♀. Loma Bonita, 19-ii-2010, 1 ♀.

Distribution. MEXICO (Chiapas) (Ibáñez-Bernal 2001), BELIZE, GUATEMALA (Young & Duncan 1994).

Remarks. Females of this species group cannot be separated. Females are recorded here as *Da. delpozoi* because we found them in relation to males. Female feeding habits are unknown, although they appeared to not be anthropophilous.

***Dampfomyia* (*Dampfomyia*) *Addis*, 1945**

Phlebotomus (*Dampfomyia*) *Addis*, 1945: 120. Type-species: *Phlebotomus anthophorus* *Addis* (original designation).

Lutzomyia (*Dampfomyia*) *Addis*: Barretto, 1962: 95 (diagnosis); Young & Duncan, 1994: 249 (diagnosis, key, distribution).

Phlebotomus (*Anthophorus*) *De León*, 1971: 187 (*sic!*).

Dampfomyia (*Dampfomyia*) *Addis*: Galati, 1985: 137; Galati, 2003: 39 (listed).

Diagnosis. Flagellomere 3 without sensorial papilla. Males: lateral lobe thin; paramere with a setose process. Female: cibarium with 4 to 6 horizontal teeth; spermathecae with bubble-like evaginations (Young & Duncan 1994, Galati 2003).

Remarks. Five species of this subgenus have been recorded in Mexico, but in this work we found only one.

***Dampfomyia* (*Dampfomyia*) *permira* (Fairchild & Hertig, 1956)**

(Figures 12–16)

Phlebotomus permirus Fairchild & Hertig, 1956: 312 (♀). Type locality: Mexico, Chiapas, Palenque. Additional references: Lewis & Garnham, 1959: 83 (♂).

Phlebotomus tikalensis *De León*, 1971: 190 (♂). Type locality: Guatemala, Petén, Dos Lagunas. Additional references: Young & Duncan, 1994: 252 (synonym with *Lu. permira*).

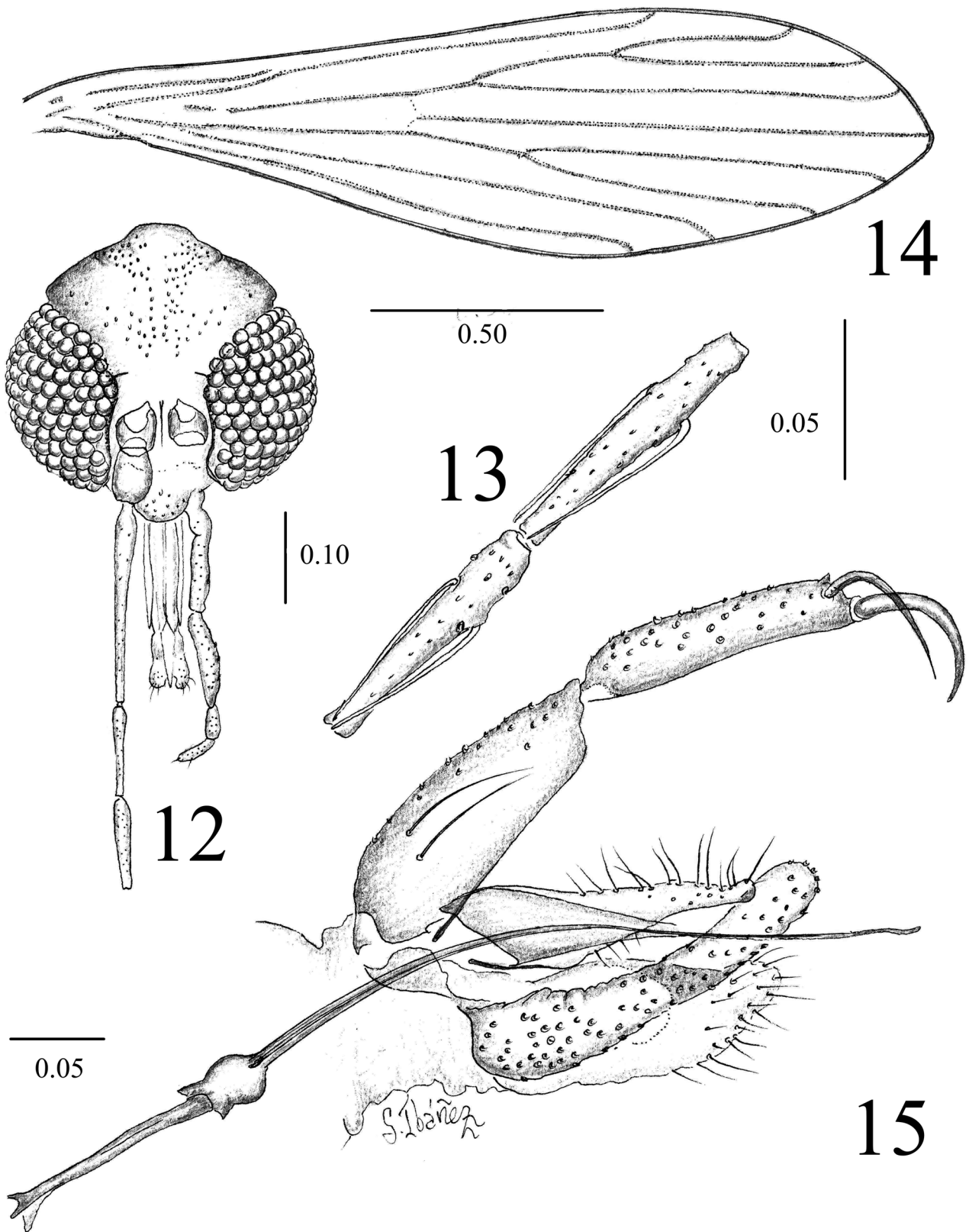
Lutzomyia (*Dampfomyia*) *permira* (Fairchild & Hertig): Young & Duncan, 1994: 252 (references, taxonomy, distribution). Additional references: Rebollar-Téllez *et al.*, 2004: 285 (Campeche records), May-Uc *et al.*, 2011: 279 (Quintana Roo records).

Dampfomyia (*Dampfomyia*) *permira* (Fairchild & Hertig): Galati, 2003: 39, 102 (list, keys); Ibáñez-Bernal *et al.*, 2011: 36 (Veracruz records).

Diagnosis. Male: Gonocoxite about 2.0 times as long as broad, gonostylus with two strong, one thin spiniform setae and a preapical small setae; paramere with a long slender ventral arm and without dorsal triangular projection (nor considering the terminalia inversion); spermal duct tips strongly enlarged. Female: spermathecae with large rounded protuberances at base and finger-like vesicles at apex, almost lacking individual ducts (Young & Duncan 1994; Galati 2003).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 05-ix-2009, 1 ♂; 20-iv-2010, 1 ♀; 13-v-2010, 2 ♀; 17-xi-2010, 2 ♀; 01-xii-2010, 1 ♂; 19-i-2011, 2 ♀; 20-i-2011, 3 ♀; 08-ii-2011, 2 ♀; 10-ii-2011, 2 ♀. Loma Bonita, 16-i-2010, 1 ♀; 19-iii-2010, 1 ♀; 20-iii-2010, 3 ♀; 22-iv-2010, 1 ♀; 14-v-2010, 1 ♀; 16-v-2010, 1 ♂, 1 ♀;

23-x-2010, 1 ♀; 21-i-2011, 1 ♀; 22-i-2011, 2 ♀; 18-iii-2011, 2 ♀; 19-iii-2011, 2 ♀; 20-iii-2011, 2 ♀; 08-vi-2011, 1 ♂; 20-vii-2011, 1 ♀. Collected with CDC light traps.



FIGURES 12–15. *Psychodopygus bispinosus* (Fairchild & Hertig, 1951), male. 12) Head, frontal view; 13) Flagellomere 2 and 3; 14) Wing; 15) Terminalia, lateral view. Scales in millimeters.

Additional material collected with Magoon traps. MEXICO: CHIAPAS: Guadalupe Miramar, 16-vi-2009, 1 ♀. Loma Bonita, 21-iv-2010, 1 ♀.

Distribution. MEXICO (Chiapas, Veracruz) (Ibáñez-Bernal *et al.* 2011), GUATEMALA, BELIZE (Ibáñez-Bernal 2001, Young & Duncan 1994, Galati 2003).

Remarks. The male of *Da. permira* is easily to separate from other species of *Dampfomyia* by the characteristic morphology of the parameres. This is not the case for females, as *Da. leohidalgoi* (Ibáñez-Bernal, Hernández-Xoliot & Mendoza, 2006) is very similar, only differentiated by the relative length of the spermathecal ducts. *Da. permira* has spermathecal projections smaller and finger-like, similar to those of *Da. leohidalgoi*, but the individual ducts of *Da. permira* are comparatively short and broad. Females apparently feed on the blood of small mammals.

***Trichopygomyia* Barretto, 1962**

Lutzomyia, subgenus *Trichopygomyia* Barretto, 1962: 98. Type species: *Flebotomus longispinus* Mangabeira (original designation). Additional references: Forattini, 1971: 102 (in part); Forattini, 1973: 292; Martins *et al.*, 1978: 112; Arias *et al.*, 1983: 449; Artemiev, 1991: 74; Young & Duncan, 1994: 418 (revision, keys).

Lutzomyia species group *longispina* Theodor, 1965: 189; Lewis *et al.*, 1977: 325.

Trichopygomyia Barretto, 1962 (as genus): Galati, 2003: 40, 105, 106 (list, keys).

Diagnosis. Antennal ascoids simple, reaching or surpassing distal fourth of flagellomere; palpal segment 5 longer than palpal segments 2+3. Male: gonocoxite without compact basal tuft of setae, but some setae may be present on the ventral inner face; gonostylus with 4 large spines inserted at different levels and with preapical setae; paramere with one or two additional branches. Female: cibarium with 4 evenly spaced horizontal teeth and one or two rows of vertical teeth; spermathecae striated; spermathecal individual ducts as long as or longer than common duct (Young & Duncan 1994, Galati 2003).

Remarks. *Trichopygomyia* is comprised of 15 described species with only *Trichopygomyia triramula* recorded previously in Mexico based on specimens collected in Veracruz (Ibáñez-Bernal *et al.* 2011). This species was also collected during the present study.

***Trichopygomyia triramula* (Fairchild & Hertig, 1952)**

Phlebotomus triramulus Fairchild & Hertig, 1952: 517, 525 (♂, ♀). Type locality: Panama, Colon, Medio.

Lutzomyia (*Trichopygomyia*) *triramula* (Fairchild & Hertig): Young & Duncan, 1994: 420 (taxonomy, complete references, distribution).

Trichopygomyia triramula (Fairchild & Hertig): Galati, 2003: 40, 106 (list, male key); Ibáñez-Bernal *et al.*, 2011: 37 (Veracruz records).

Diagnosis. Male: Antenna with flagellar ascoids reaching the apex of the flagellomere; Paramere trifurcate, with median lobe nearly as long as principal arm, ventral arm arched posteriorly directed, with straight setae at apex. Female: Antenna with flagellar ascoids surpassing the apex of the flagellomere; cibarium with 4 radially directed horizontal teeth, one row of few vertical teeth and a compact group of small lateral teeth, pigmented area compact and complete arch; spermatheca nearly globular with long capitulus and lightly striated surface, individual spermathecal ducts longer than common duct, cerci with narrow apex (Young & Duncan 1994, Galati 2003).

Material examined. MEXICO: CHIAPAS: Loma Bonita, 16-i-2010, 1 ♀; 16-ii-2010, 1 ♀; 19-ii-2010, 2 ♀; 20-ii-2010, 1 ♂; 21-ii-2010, 1 ♀; 24-iv-2010, 1 ♀; 16-v-2010, 1 ♀. Collected with CDC light traps.

Distribution. ECUADOR, COLOMBIA, PANAMA, COSTA RICA, GUATEMALA, BELIZE (Ibáñez-Bernal 2001, Galati 2003) and MEXICO (Ibáñez-Bernal *et al.* 2011). In Mexico, this species was previously known only from the state of Veracruz. In this work we also recorded the species in Chiapas.

Remarks. Comparatively, *Trichopygomyia triramula* is not an abundant species in Chiapas. All specimens were collected with CDC light traps. Female feeding habits are unknown but they are not anthropophilous.

Subtribu Psychodopygina Galati, 1995

Psychodopygina Galati, 1995: 137. Type genus: *Psychodopygus* Mangabeira, 1941. Additional references: Galati, 2003: 42, 72 (list, key).

Diagnosis. Palpal segment 4 shorter than 2; thorax without ventro-cervical sensilla, neither on the anterior margin of katapisternum (except in *Bichromomyia* Artemiev). Male with antennal flagellomere 1 usually with external ascoid originated apically as compared with the internal ascoid. Female cibarial armature conformed by vertical teeth that commonly are disposed in transversal rows, horizontal teeth variable and sometimes with lateral teeth (Galati 2003).

Remarks. According to Galati (2003) genera *Psathyromyia* Barretto, 1962, *Viannamyia* Mangabeira, 1941, *Martinsmyia* Galati, 1995, *Bichromomyia* Artemiev, 1991, *Psychodopygus* Mangabeira, 1941, *Nyssomyia* Barretto, 1962, and *Trichophoromyia* Barretto, 1962, are included.

Psathyromyia Barretto, 1962

Lutzomyia (*Psathyromyia*) Barretto, 1962: 98. Type species: *Phlebotomus shannoni* Dyar, 1929, by original designation). Additional references: Martins *et al.*, 1978: 104 (in part, defined); Young & Duncan, 1994: 339 (redefined, history, keys, distribution).

Lutzomyia species group *Shannoni*: Theodor, 1965: 189; Lewis *et al.*, 1977: 328.

Lutzomyia (*Trichopygomyia*) (in part): Forattini, 1971a: 102; Forattini, 1973: 294.

Lutzomyia species group *Brasiliensis* (in part): Martins *et al.*, 1978: 140.

Psathyromyia Barretto (as genus): Artemiev, 1991: 73 (in part); Galati, 1995: 137; Galati, 2003: 42, 72 (list, keys).

Diagnosis. Flagellomere ascoids usually with long basally directed branch or at least rudimentary (as in *Ps. lanei* (Barretto & Coutinho, 1941), *Ps. guatemalensis* (Porter & Young, 1986), and *Ps. punctigeniculata* (Floch & Abonnenc, 1944)); hindleg with first tarsomere longer than the length of other tarsomeres combined. Male: gonocoxite without perennial setae; gonostylus with 4 spiniform setae and no preapical fine seta. Female: cibarium with 4 to 8 horizontal teeth, vertical teeth variable, but always present, complete arch, and prominent pigmented patch (Young & Duncan 1994, Galati 2003).

Remarks. Three subgenera of genus *Psathyromyia* are recognized by Galati (1995, 2003): *Ps. (Forattiniella)* Vargas, 1978, *Ps. (Xiphomyia)* Artemiev, 1991, and *Ps. (Psathyromyia) sensu stricto*. Seven species belonging to the three subgenera have been recorded in Mexico; six species were found in this work.

Psathyromyia (Forattiniella) Vargas, 1978

Lutzomyia species group *Aragoi* Theodor, 1965: 185; Lewis *et al.*, 1977: 325; Young & Duncan, 1994: 375.

Lutzomyia species group *Brasiliensis* Martins *et al.*, 1978: 140 (in part).

Lutzomyia (Forattiniella) Vargas, 1978: 89 (in part). Type species: *Flebotomus lutzianus* Costa Lima, 1932, by original designation.

Psathyromyia (Oophoromyia) Artemiev, 1991: 73. Type species: *Flebotomus aragoi* Costa Lima, 1932, by original designation.

Psathyromyia (Forattiniella) Vargas: Galati, 1995: 137 (*Oophoromyia* as synonym); Galati, 2003: 42 (list of species).

Diagnosis. Flagellomere 1 and/or 2, and/or 3 lacking simple setae; ascoids with short but distinct proximal spurs; palpal segment 5 as long as 3+4. Male: usually with Newstead's sensilla on palpal segment 2; phallic guide as long as or longer than 2.0 times its basal width; gonocoxite with diffuse short persistent setae or without them; gonostylus with four spiniform setae and no preapical fine seta; paramere usually with dorsal hump; lateral lobes extending to or beyond the level of gonocoxite apex. Female: cibarium with 4 to 12 or more horizontal teeth, vertical teeth in rows; pharynx unarmed; palpal segment 2 with Newstead sensillae; spermathecae nearly spherical or oval without incipient annulations or cylindrical with annulations; individual spermathecal ducts longer than common duct (Galati 2003; Young & Duncan 1994).

Remarks. This subgenus comprises 14 species widely distributed in the Neotropics with one species reaching into the United States. Two species are known in Mexico both recorded in this work.

Psathyromyia (Forattiniella) carpenteri (Fairchild & Hertig 1953)

Phlebotomus carpenteri Fairchild & Hertig, 1953: 28 (♂). Type locality: Panama, Canal Zone, Chiva Chiva.

Psychodopygus (Trichophoromyia) carpenteri (Fairchild & Hertig): Forattini, 1971: 105; Forattini, 1973: 462.

Lutzomyia species group *Brasiliensis*: Martins *et al.*, 1978: 144.

Lutzomyia carpenteri species group *Aragoi* (Fairchild & Hertig): Young & Duncan, 1994: 379 (references, distribution); Ibáñez-Bernal, 2002: 161 (references, diagnosis, distribution); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records), Rebollar-Téllez *et al.*, 2006: 22 (Yucatan records), May-Uc *et al.*, 2011: 279 Quintana Roo records); Mickery-Pacheco *et al.*, 2012: 401 (Chiapas records).

Psathyromyia (Forattiniella) carpenteri (Fairchild & Hertig): Galati, 2003: 42, 111, 112 (list, keys), Ibáñez-Bernal *et al.*, 2011: 37 (Veracruz records).

Diagnosis. Male: gonostylus with internal spiniform seta isolated, implanted in apical third; ejaculatory filaments not longer than 5.0 times the length of apodeme + sperm pump, their tips hook-like; female: cibarium with about 12 horizontal teeth; spermathecal individual ducts striated, spermathecae globose, pear-shaped, with sessile capitulum (Galati 2003, Young & Duncan 1994).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 16-ii-2010, 1 ♂; 17-ii-2010, 3 ♂; 19-iii-2010, 1 ♂; 12-v-2010, 9 ♂; 13-v-2010, 1 ♂; 14-v-2010, 1 ♂; 17-v-2010, 1 #; 20-x-2010, 1 ♂; 18-xi-2010, 1 ♂; 15-iii-2011, 1 ♂. Loma Bonita: 19-ii-2010, 1 ♂; 22-iii-2010, 1 ♂, 1 ♀; 20-iv-2010, 2 ♀; 21-iv-2010, 2 ♀. San Antonio Buena Vista: 17-iv-2010, 3 ♀. Collected with CDC light traps.

Additional material collected with Magoon traps. Loma Bonita: 15-v-2010, 1 ♀. San Antonio Buenavista: 07-viii-2009, 4 ♀; 24-iii-2010, 1 ♂.

Distribution. MEXICO (Campeche, Chiapas, Quintana Roo, Veracruz, Yucatan), BELIZE, COSTA RICA, PANAMA, COLOMBIA (Galati 2003, Young & Duncan 1994).

Remarks. Most collections of this species were made with CDC light traps in disturbed areas such as acahual and coffee plantations. Some specimens were collected outside of the houses and very few were collected in the ever green forest. Only six specimens were collected with a Magoon trap. Female feeding habits are unknown but they are not anthropophilic.

Psathyromyia (Forattiniella) texana (Dampf, 1938)

Phlebotomus texanus Dampf, 1938: 119 (♂, ♀). Type locality: USA, Texas, Bexar Co., San Antonio.

Psychodopygus (Trichophoromyia) texanus (Dampf): Forattini, 1971: 105; Forattini, 1973: 480.

Lutzomyia texana species group *Brasiliensis*: Martins *et al.*, 1978: 146.

Lutzomyia texana (Dampf), species group *Aragoi*: Young & Perkins, 1984: 276 (taxonomy); Young & Duncan, 1994: 380 (references, taxonomy, distribution); Ibáñez-Bernal, 2002: 164 (references, diagnosis, distribution); Mickery-Pacheco *et al.*, 2012: 401 (Chiapas record); Pérez *et al.*, 2014: 82 (Chiapas record).

Psathyromyia (Forattiniella) texana (Dampf): Galati, 2003: 42, 111, 112 (list, keys); Ibáñez-Bernal *et al.*, 2011: 37 (Veracruz records).

Diagnosis. Male: gonocoxite with diffuse persistent setae setae near middle; gonostylus with 4 spiniform setae implanted at different levels; paramere with setae on apical half; aedeagal adminiculum reaching the middle of paramere; ejaculatory filaments no longer than 3.0 times the length of apodeme + pump, apex not modified. Female: palpus segment 4 without Newstead sensillae; spermathecal ducts smooth, spermathecae globose, with capitulum sessile, disc shaped; cibarium with more than 12 horizontal teeth, vertical teeth strong at center and in one row, small and in group laterally (Galati 2003; Young & Duncan 1994).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar: 09-xi-2009, 1 ♂; 17-ii-2010, 1 ♂, 1 ♀; 20-iv-2010, 2 ♀; 14-v-2010, 2 ♀; 17-v-2010, 1 ♂; 20-vi-2010, 1 ♀; 12-ii-2011, 2 ♀; 13-ii-2011, 1 ♀. Loma Bonita: 22-x-2009, 1 ♀; 18-ii-2010, 1 ♀; 21-iii-2010, 2 ♀; 21-iv-2010, 3 ♀; 16-vi-2010, 1 ♀; 19-vi-2010, 2 ♀; 20-iii-2011, 1 ♀. Collected with CDC light traps.

Distribution. USA (Young & Perkins 1984), MEXICO (Chiapas, Guerrero, Jalisco, Morelos, Nayarit, Oaxaca, San Luis Potosí, Tamaulipas, Veracruz) (Ibáñez-Bernal 2005a, Ibáñez-Bernal *et al.* 2011, Mickery-Pacheco *et al.* 2012, Pérez *et al.* 2014), HONDURAS (Galati 2003).

Remarks. This species is not anthropophilous. However, most of the collections of this species were made

within the communities, inside and outside houses, and in disturbed areas such as coffee plantations. All specimens were collected with light traps.

Psathyromyia (Psathyromyia) s. str. Barretto, 1962

Lutzomyia (Psathyromyia) Barretto, 1962: 98. Type species: *Phlebotomus shannoni* Dyar, 1929, by original designation; Martins *et al.*, 1978: 104 (in part).

Lutzomyia species group *Shannoni*: Theodor, 1965: 189; Lewis *et al.*, 1977: 328.

Lutzomyia (Trichopygomyia) Barretto, 1962: 98 (in part): Forattini, 1971: 102; Forattini, 1973: 294.

Lutzomyia species group *Brasiliensis*: Martins *et al.*, 1978: 104 (in part).

Psathyromyia (Psathyromyia) Barretto: Artemiev, 1991: 73; Galati, 1995: 137; Galati, 2003: 43, 113 (list, keys).

Diagnosis. Flagellomeres 1 and 2 without sensory papillae; palpus segment 2 normally without Newstead sensillae; palpomere 5 short, usually shorter than 2+3+4. Male: gonocoxite without group of setae in apical half; aedeagal adminiculum short, not longer than 2.0 times the basal width. Female: palpus segment 5 longer than 3; cibarium with 4 to 8 horizontal teeth, vertical teeth variable but always present, a complete arch and large pigmented patch (Young & Duncan 1994; Galati 2003).

Remarks. Two series of species are recognized in this subgenus, series *lanei* Theodor 1965, with three species recorded in Brazil, and series *shannoni* Fairchild 1955, with 20 species widely distributed, with four species distributed in Mexico, one reaching the United States.

Psathyromyia (Psathyromyia) dasymera (Fairchild & Hertig 1961) (series shannoni)

Phlebotomus dasymerus Fairchild & Hertig, 1961b: 242 (♂, ♀). Type locality: Panama, Canal Zone, Ft. Sherman Reservation, Camp Pina.

Lutzomyia dasymera (Fairchild & Hertig): Barretto, 1962: 99; Theodor, 1965: 194 (listed as species group *Castanheirai*); Martins *et al.*, 1978: 154 (as species group *Dreisbachi*, references, distribution); Young, 1979: 111 (references); Feliciangeli, 1980: 246 (Venezuela records); Biancardi *et al.*, 1982: 168 (Brazil records); Christensen *et al.*, 1983: 466 (Panama records); Murillo & Zeledón, 1985: 87 (Costa Rica records); Feliciangeli, 1988: 107 (Venezuela records); Alexander *et al.*, 1992a: 36 (Ecuador records); Alexander *et al.*, 1992b: 124 (Ecuador records).

Lutzomyia (Trichopygomyia) dasymera (Fairchild & Hertig): Forattini, 1971: 102; Forattini, 1973: 305.

Lutzomyia (Psathyromyia) dasymera (Fairchild & Hertig): Young & Duncan, 1994: 342 (references, taxonomy, distribution); Ibáñez-Bernal, 2002: 151.

Psathyromyia (Psathyromyia) dasymera (Fairchild & Hertig): Galati, 2003: 43, 114, 115 (list, keys).

Diagnosis. Male: gonocoxite without tuft of perennial setae; gonostylus with 4 spiniform setae, two basal at same level just before middle, one preapical in the apical fourth and one apical, without preapical fine seta; paramere with a basal ventral hump and very close to it posteriorly a ventral short protuberance with about 10 specialized setae and apex curved as a hook. Female: cibarium with about 10 horizontal teeth and about 10 longitudinal rows of vertical teeth, pigmented area large and cibarial arch complete; spermatheca cylindrical with broad capitulum which is as wide as the spermatheca; spermathecal individual ducts long about 3.5X the length of spermatheca, individual spermathecal duct very short as long as one-half the length of spermatheca (Fairchild & Hertig 1961; Young & Duncan 1994; Galati 2003).

Material examined. MEXICO: CHIAPAS: Loma Bonita, 20-iii-2010, 1 ♂. Collected with CDC light trap.

Distribution. MEXICO (Chiapas); BELIZE; NICARAGUA; COSTA RICA (Murillo & Zeledón 1985); PANAMA; COLOMBIA; VENEZUELA (Martins *et al.* 1978; Young 1979; Feliciangeli 1988); BRAZIL (Biancardi *et al.* 1982); ECUADOR (Alexander *et al.* 1992a, Alexander *et al.* 1992b) (Young & Duncan 1994).

Remarks. Female of *Pa. dasymera* cannot be separated from that of *Pa. campbelli* (Damasceno, Causey & Arouck), but the male can be distinguished by the simple apex of the ejaculatory filaments, as *Pa. campbelli* has the apex modified with short setae; the female is as well similar, but *Pa. campbelli* has the individual spermathecal ducts with the half near the spermatheca more sclerotized and striated. *Psathyromyia dasymera* is rare in Mexico, as only the specimens saw by Fairchild & Hertig (1961) were known. Female feeding habits are not known but they are not anthropophilous.

***Psathyromyia (Psathyromyia) shannoni* (Dyar, 1929) (series *shannoni*)**

Phlebotomus shannoni Dyar, 1929: 121 (♂). Type locality: Panama, Canal Zone. Additional references: Fairchild & Hertig, 1950: 524 (♂, ♀).

Phlebotomus limai Fonseca, 1935: 61 (♀). Type locality: Brazil, São Paulo.

Phlebotomus bigeniculatus Floch & Abonnenc 1941b, 3 (♂, ♀). Type locality: French Guyenne, Cayenne.

Phlebotomus microcephalus Barretto & Duret, 1953: 34 (♂). Type locality: Argentina, Chaco, Presidencia Roca.

Phlebotomus pifanoi Ortiz, 1972: 21 (♂) Type locality: Venezuela: Amazonas, Sierra Parima.

Lutzomyia (Psathyromyia) shannoni (Dyar): Young & Duncan, 1994: 349 (complete references to that date, taxonomy, distribution); Ibáñez-Bernal, 2002: 152 (diagnosis, distribution); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records); Rebollar-Téllez *et al.*, 2006: 24 (Yucatán records), May-Uc *et al.*, 2011: 279 (Quintana Roo records).

Psathyromyia (Psathyromyia) shannoni (Dyar): Galati, 2003: 43, 115, 116 (list, keys); Ibáñez-Bernal *et al.*, 2011: 35 (Veracruz records).

Diagnosis. Ascoids each with a long proximal branch reaching or exceeding the proximal margin of the flagellomere. Male: Gonocoxite without tuft of setae; gonostylus with 4 spiniform setae, two in middle and at the same level, one in the apical third and one apical; paramere simple, with apex straight and rounded, with simple straight setae in the apical half, only on the ventral margin (that directed to the gonopods); ejaculatory filaments with simple apex. Female: cibarium with four horizontal teeth evenly spaced, vertical teeth numerous, all small arranged in irregular compact rows; spermatheca cylindrical, smooth, with a small capitulum; individual spermathecal ducts shortest than spermatheca and about 0.5 the length of common spermathecal duct (Ibáñez-Bernal 2002, Young & Duncan 1994; Galati 2003).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 14-i-2010, 1 ♀; 20-ii-2010, 6 ♀; 12-v-2010, 1 ♂; 20-vi-2010, 2 ♀. Loma Bonita, 18-ii-2010, 1 ♀; 19-ii-2010, 2 ♂; 21-ii-2010, 1 ♀; 20-iii-2010, 1 ♀; 23-iv-2010, 1 ♀; 22-i-2011, 1 ♀; 19-iii-2011, 2 ♀. San Antonio Buena Vista: 19-v-2010, 1 ♀. Collected with CDC light traps.

Additional material collected with Magoon traps. MEXICO: CHIAPAS: Loma Bonita, 19-ii-2010, 1 ♀; 15-iii-2011, 2 ♀.

Distribution. USA, MEXICO (Campeche, Chiapas, Guerrero, Nayarit, Oaxaca, Puebla, Quintana Roo, Veracruz, Yucatán) (Ibáñez-Bernal 2002, Ibáñez-Bernal *et al.* 2011), BELIZE, HONDURAS, NICARAGUA, COSTA RICA, PANAMA, COLOMBIA, VENEZUELA, TRINIDAD, SURINAME, FRENCH GUYANA, ECUADOR, PERU, BRAZIL, BOLIVIA, PARAGUAY, ARGENTINA (Young & Duncan 1994, Galati 2003).

Remarks. The male of *Psathyromyia shannoni* is morphologically similar to other species; however, the ascoids having a long proximal branch helps to separate it; additionally differences in the parameres can be used to distinguish it from *Pa. undulata* (Fairchild & Hertig); the female of this species could be confused with *Pa. dasymera* (Fairchild & Hertig) or *Pa. punctigeniculata* (Floch & Abonnenc) as they have similar spermathecae, and for that reason it is necessary to measure the relative length of the spermathecal ducts. *Psathyromyia shannoni* has a wide distribution in the Americas. There are few records in Mexico, but localities in which this species has been collected are disjunct so it is possible to infer that the species has a wide range of distribution in this country. Recent evidence shows that populations of this species from the USA and southern Mexico, exhibited a great separation among the genetic haplotypes (Florin & Rebollar-Téllez 2013). The female is antropophilous and has been collected at sites where human leishmaniasis cases have been recorded. Pech-May *et al.* (2010) and Sánchez-García *et al.* (2010) found this species naturally infected with *Leishmania mexicana* in the Mexican states of Campeche and Quintana Roo, respectively.

***Psathyromyia (Psathyromyia) undulata* (Fairchild & Hertig, 1950) (series *shannoni*)**

Phlebotomus undulatus Fairchild & Hertig, 1950: 524 (♂). Type locality: Guatemala, between Esquintla and San José.

Phlebotomus humboldti Vargas & Díaz-Nájera, 1959: 143 (♂, ♀). Type locality: Mexico, Oaxaca. Additional references: Rosabal & Trejos, 1964: 169 (as synonym of *Phlebotomus undulatus*).

Lutzomyia (Psathyromyia) undulata (Fairchild & Hertig): Barretto, 1962: 99 (list); Martins *et al.*, 1978: 111 (catalogue); Young & Duncan, 1994: 345 (complete references to that date, taxonomy, distribution); Ibáñez-Bernal, 2002: 157 (diagnosis, distribution, Mexican records); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records), May-Uc *et al.*, 2011: 279 (Quintana Roo records).

Lutzomyia (Trichopygomyia) undulata (Fairchild & Hertig): Forattini, 1973: 323, 325.

Psathyromyia (Psathyromyia) undulata (Fairchild & Hertig): Galati, 2003: 43, 115 (list, keys); Ibáñez-Bernal *et al.*, 2011: 35 (Veracruz records).

Diagnosis. Ascoids each with a long proximal branch reaching or exceeding the proximal margin of the flagellomere. Male: paramere thin with sinuous setae in ventral margin of apical portion (directed toward gonopod). Female: cibarium with 6 or more horizontal teeth, numerous vertical teeth irregularly placed, with the central teeth more robust compared to those at the edge, arch complete and pigmented area extensive; spermathecae cylindrical, annulated, longer than individual spermathecal ducts and as long as common duct. Female is indistinguishable from that of *Pa. cratifer* (Fairchild & Hertig).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 17-ii-2010, 1 ♂. Collected with CDC light trap.

Distribution. MEXICO (Chiapas, Oaxaca, Veracruz), BELIZE, GUATEMALA, HONDURAS, EL SALVADOR, COSTA RICA, COLOMBIA, ECUADOR (Young & Duncan 1994; Alexander *et al.* 1996; Ibáñez-Bernal 2002).

Remarks. Males are easily distinguished from other species by the shape of the parameres, but it is impossible to separate the females from those of *Pa. cratifer* (Fairchild & Hertig); for that reason, we present below undetermined females of these species, as *Pa. cratifer* also has been collected in Chiapas, despite the fact that, in this work, we did not find males. Female feeding habits are not known but they are not anthropophilous.

Undetermined females of *Pa. cratifer* or *Pa. undulata*

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar, 18-ii-2010, 2 ♀; 19-iii-2010, 1 ♀; 13-v-2010, 1 ♀; 21-x-2010, 1 ♀. Loma Bonita: 22-x-2010, 1 ♀; 19-iii-2011, 1 ♀. Collected with CDC light traps.

Psathyromyia (Xiphopsathyromyia) Ibáñez-Bernal & Marina, nomen novum

Lutzomyia species group *Dreischachi*: Lewis *et al.*, 1977: 325; Martins *et al.*, 1978: 152 (list); Young & Duncan, 1994: 411 (references, taxonomy, and distribution).

Lutzomyia (Xiphomyia) Artemiev, 1991: 73. Type species: *Psathyromyia aclydifera* (Fairchild & Hertig) (by original designation), not *Xiphomyia* Townsend, 1917 (Tachinidae). Additional references: Galati, 1995, 137; Galati 2003, 42 (list, keys).

Young & Duncan (1994) were the first to note that the name *Xiphomyia* was preoccupied for a genus of Tachinidae (Diptera). Nevertheless, as they did not recognize the taxon in the sense of Artemiev (1991) they continued using the species group *Dreischachi* and consequentially did nothing with the homonym. Later, Galati (1995) and Galati (2003) used *Xiphomyia* for this group without acknowledging the homonymy. In order to make it possible to apply the phylogenetic classification of Galati in general, it is necessary to propose a new name to replace the homonym.

Etymology. *Xiphopsathyromyia*, from Greek, *xiphos*, a Greek sword, and *Psathyromyia*, name of the genus to which this subgenus belongs. We preserve the prefix *xiphos* of Artemiev added to the complex name of the genus *Psathyromyia*, which is formed by *psathyros*, friable, and *myia*, fly. The idea of the new name is to help in relating this group of species to the original taxon nomination as well as denoting the actual position within the genus.

Diagnosis. Antennal flagellomeres 10 and 11 with sensory papillae; ascoids with long proximal spurs. Palpal segment 5 shorter than palpal segments 3 + 4; segment 2 without Newstead sensillae; ventro-cervical sensilla absent; tarsomere 1 of hindleg as long as or longer than 2+3+4+5. Male: gonostylus with 4 large spiniform setae inserted at different levels and no preapical fine seta; gonocoxite with 3 or 4 preapical recurved setae, but other persistent setae could be present as in *Pa. aclydifera*; paramere variable, divided or not; lateral lobe with 7 to 10 large dorsal setae at or near its distal end; ejaculatory filaments shortest than 2.0 times the length of apodeme + sperm pump. Female: cibarium with 10 or more horizontal teeth, numerous vertical teeth, a broad pigment patch, and complete arch; pharynx unarmed; spermathecae strongly annulated, sometimes imbricated, the terminal knob large, symmetrical or asymmetrical; individual spermathecal ducts relatively thin, longer than common spermathecal duct (Young & Duncan 1994; Galati 2003).

Type species. *Psathyromyia* (*Xiphopsathyromyia*) *dreisbachi* (Causey & Damasceno, 1945), originally designated by Artemiev (1991).

Remarks. This subgenus is currently comprised of four valid species: *Psathyromyia aclydifera* (Fairchild & Hertig, 1952), *Pa. dreisbachi* (Causey & Damasceno, 1945), *Pa. hermanlenti* (Martins, Silva & Falcão, 1970) and *Pa. ruparupa* (Martins, Llanos & Silva, 1976). Only one species has been recorded in Mexico.

***Psathyromyia* (*Xiphopsathyromyia*) *aclydifera* (Fairchild & Hertig, 1952)**

Phlebotomus aclydiferus Fairchild & Hertig, 1952: 511 (♂, ♀). Type locality: Panama, Canal Zone, Gatun, Mojinga.

Lutzomyia aclydifera, species group *Castanheirai*: Theodor, 1965: 193.

Lutzomyia aclydifera, species group *Dreisbachi*: Martins *et al.*, 1978: 153 (distribution); Young, 1979: 137 (full references); Christensen *et al.*, 1983: 469 (Panama); Zeledón & Murillo, 1983: 280 (Nicaragua); Young & Rogers, 1984: 599 (Ecuador); Murillo & Zeledón, 1985: 125 (Costa Rica); Le Pont & Desjeux, 1986: 314 (Bolivia); Rowton *et al.*, 1991: 501 (Guatemala); Alexander *et al.*, 1992a: 36 (Ecuador); Alexander *et al.*, 1992b: 124 (Ecuador); Young & Duncan, 1994: 412 (references, taxonomy, distribution).

Psychodopygus aclydiferus (Fairchild & Hertig): Forattini, 1971: 105 (list); Forattini, 1973: 463 (taxonomy).

Psathyromyia (*Xiphomyia*) *aclydifera* (Fairchild & Hertig): Artemiev, 1991: 73; Galati, 2003: 42 (list, keys).

Diagnosis. Male: gonocoxite with 2 or 3 specialized broad setae near middle, and a group of perennial setae near apex; gonostylus with 4 spiniform setae, all at different levels; paramere with a rounded protuberance bearing specialized setae near middle of the dorsal margin (directed toward lateral lobes), distal half dorsally directed and with a leaf-like setae at apex. Female: cibarium with 10 to 12 horizontal teeth and one or at most two rows of small vertical teeth, arch complete; spermatheca somewhat asymmetrical, with long drop-shaped capitulum, imbricated, individual spermathecal ducts longer than spermatheca, and common spermathecal duct as long as spermatheca (Young & Duncan 1994; Galati 2003).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar: 03-xii-2010, 1 ♀. Loma Bonita, 21-ii-2010, 1 ♂. Collected with CDC light trap.

Distribution. MEXICO (Chiapas) (Vargas & Díaz-Nájera 1953b), BELIZE, GUATEMALA, HONDURAS, NICARAGUA, COSTA RICA, PANAMA, COLOMBIA, ECUADOR, BOLIVIA (Young & Duncan 1994).

Remarks. Females of this subgenus are very similar and have yet to be thoroughly described. In Mexico, this species has only been recorded in Chiapas, and seems to be very rare in comparison with other phlebotomine sand flies. Females apparently feed on small mammals.

***Bichromomyia* Artemiev, 1991**

Lutzomyia species complex *flaviscutellata*: Lewis, 1975: 363.

Nyssomyia (*Bichromomyia*) Artemiev, 1991: 73. Type species: *Flebotomus flaviscutellatus* Mangabeira, 1942, by original designation.

Lutzomyia (*Nyssomyia*) Barretto: Young & Duncan, 1994: 445 (in part).

Bichromomyia Artemiev: Galati, 1995: 137 (as genus); Galati, 2003: 44.

Diagnosis. Flagellomeres with short simple ascoids; thorax bicolored, usually anterior part of mesonotum strongly pigmented contrasting with pale posterior portions; anterior portion of katapisternum with setae. Male: clypeus short no more than the length of eyes; abdominal terga usually with papillae; gonostylus with 4 spiniform setae, all implanted in the apical half. Female: palpus segment 5 shorter than or as long as palpus segment 3; lacinia with one row of external teeth; clypeus at least as long as eye length; spermathecae annulated (Young & Duncan 1994; Galati 2003).

Remarks. This genus includes four species. With the exception of *Bi. inornata* (Martins, Falcão & Silva), all of them have been reported as infected with *Leishmania* spp. *Bichromomyia olmeca* is represented by three subspecies, one distributed in Mexico.

***Bichromomyia olmeca olmeca* (Vargas & Díaz-Nájera, 1959)**

- Phlebotomus olmecus* Vargas & Díaz-Nájera, 1959: 147 (♂, the ♀ correspond to *Bi. ylephiletor*). Type locality: Mexico, Tabasco, Teapa.
- Phlebotomus (Psychodopygus) apicalis* Lewis & Garnham, 1959: 89 (♂, ♀, not *Phlebotomus apicalis* Floch & Abonnenc = *flaviscutellatus* Mangabeira). Type locality: Belize.
- Phlebotomus flaviscutellatus* Mangabeira: Biagi *et al.*, 1965: 267 (vector of *Leishmania* in Mexico); Biagi, 1966: 370 (key).
- Psychodopygus (Trichophoromyia) olmecus* (Vargas & Díaz-Nájera): Forattini, 1971: 105; Forattini, 1973: 434.
- Lutzomyia (Nyssomyia) olmeca olmeca* (Vargas & Díaz-Nájera): Young & Duncan, 1994: 452 (complete references, taxonomy, distribution); Ibáñez-Bernal, 2002: 172 (diagnosis, Mexican records); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records); Rebollar-Téllez *et al.*, 2005: 197 (Campeche abundance data); Rebollar-Téllez *et al.*, 2006: 23 (Yucatán records), Pech-May *et al.*, 2010: 150 (Campeche infection rates), Sánchez-García *et al.* 2010: 457 (Quintana Roo infection rates); May-Uc *et al.*, 2011: 279 (Quintana Roo records).
- Bichromomyia olmeca olmeca* (Vargas & Díaz-Nájera): Galati, 2003: 44, 118, 119 (list, keys); Ibáñez-Bernal *et al.*, 2011: 36 (Veracruz records).

Diagnosis. Head longer than wide; mesonotum bicolored, anterior half of scutum and pronotum dark pigmented, posterior half and scutellum pale. Male: palpus segment 5 about as long as 3; lateral lobe as long as gonocoxite; gonocoxite without setae tuft; gonostylus with the two basal spiniform setae at same level, one preapical and one apical; paramere simple and straight; ejaculatory filaments longer than 2.8X the length of aedeagal apodeme + pump; Female: interocular distance similar to clypeus width; cibarium with 8 to 12 horizontal teeth; steam of furca with broad blade-like steam; individual spermathecal ducts shorter than spermatheca, but longer than one-half its length; common spermathecal duct about 2.5 times the length of spermatheca; spermatheca with short and broad oval capitulum and about 12 or 13 distinct annuli (Young & Duncan 1994; Galati 2003).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar: 18-iii-2010, 1 ♀; 08-ii-2011, 1 ♀; 10-ii-2011, 1 ♀. Loma Bonita: 15-i-2010, 2 ♀; 19-ii-2010, 2 ♂; 20-iii-2010, 1 ♀; 21-iii-2010, 1 ♀; 19-xi-2010, 1 ♂. Collected with CDC light traps.

Distribution. MEXICO (Campeche, Chiapas, Oaxaca, Quintana Roo, Tabasco, Veracruz, Yucatán) (Ibáñez-Bernal 2002), BELIZE, GUATEMALA, HONDURAS, NICARAGUA, COSTA RICA (Young & Duncan 1994; Galati 2003).

Remarks. This species was not abundant but is present in the area studied. It is an anthropophilic species and has been demonstrated as a competent vector of *Leishmania mexicana* to humans (Biagi *et al.* 1965). Further studies have confirmed the role of this species as a vector of *Leishmania mexicana* in the Mexican states of Campeche (Pech-May *et al.* 2010) and Quintana Roo (Sánchez-García *et al.* 2010).

***Psychodopygus* Mangabeira, 1941**

- Phlebotomus (Shannonomyia)* Dyar, 1929: 117. Type species: *Phlebotomus panamensis* Shannon, by original designation), not *Shannonomyia* Alexander, 1929 (Diptera: Limoniidae).
- Flebotomus (Psychodopygus)* Mangabeira, 1941c: 237. Type species: *Flebotomus unisetosus* Mangabeira, by original designation).
- Phlebotomus (Shannonomyia)* Pratt, 1947: 86 (new name for *Shannonomyia* Dyar, not *Shannonomyia* Alexander). Additional references: Fairchild & Hertig, 1951a: 399 (review); Fairchild, 1955: 188 (defined).
- Lutzomyia (Psychodopygus)* Mangabeira: Barretto, 1962: 93 (defined); Theodor, 1965: 188 (defined); Barretto, 1966: 133 (key); Lewis *et al.*, 1977: 328; Martins *et al.*, 1978: 34 (defined).
- Psychodopygus* Mangabeira (as genus): Forattini, 1971: 104; Forattini, 1973: 392 (defined); Ready *et al.*, 1980: 75 (taxonomy); Artemiev, 1991: 73; Galati, 1995: 137 (list); Galati, 2003: 44, 119 (list, key).
- Phlebotomus (Psychodopygus)* Mangabeira: Ortiz, 1972b: 221 (key).
- Psychodopygus (Eupsychodopygus)* Artemiev, 1991: 73. Type species: *Flebotomus arthuri* Fonseca, by original designation.

Diagnosis. Ascoids simple; flagellomere 1 with two or more sensory papillae; katapisternum without setae on anterior margin. Male: palpus segments 4+5 as long as or shorter than palpus segment 3; abdominal terga without papillae; gonocoxite lacking basal setae tuft. Female: clypeus usually shorter than eyes; lacinia usually with two external rows of teeth; cibarium with 4 to 8 horizontal teeth; spermathecae imbricated; individual spermathecal ducts and at least part of common spermathecal duct rugose or striated (Young & Duncan 1994, Galati 2003).

Remarks. Galati (2003) distinguished 6 species series to include 33 described and 2 unnamed species. Previously, only *Psychodopygus panamensis* (Shannon) was known to occur in Mexico but in this work we record 2 additional species for the country.

Psychodopygus bispinosus* (Fairchild & Hertig 1951), series *bispinosus

(Figures 12–16)

Phlebotomus bispinosus Fairchild & Hertig, 1951a: 410 (♂, ♀). Type locality: Panama, Cerro Jefe, La Victoria. Additional references: Lewis & Gamham, 1959: 80 (Belize records).

Lutzomyia (Psychodopygus) bispinosa (Fairchild & Hertig): Barretto, 1962: 94 (list); Arias & Freitas, 1977b: 511 (Brazil records); Léger *et al.*, 1977: 223 (French Guiana record); Martins *et al.*, 1978: 46 (references, distribution); Young, 1979: 173 (figures, references); Le Pont & Pajot, 1980: 64 (*cf.* to *clausirei*); Morales & Minter, 1981: 97 (Colombia); Williams, 1983: 489 (taxonomy); Young & Rogers, 1984: 599 (Ecuador record); Porter *et al.*, 1987: 929 (Guatemala record); Herrero & Jiménez, 1992: 151 (Costa Rica records).

Psychodopygus bispinosus (Fairchild & Hertig): Forattini, 1973: 170 (figures, taxonomy); Lainson *et al.*, 1976a: 57 (Brazil records); Le Pont, 1990: 673 (French Guiana); Galati, 2003: 45 (as *bispinosus* series).

Diagnosis. Anapimeron without setae. Male: gonostylus with only two spiniform setae at apex, nearly as long as gonocoxite; paramere simple, straight. Female: cibarium with 4 horizontal teeth, two longitudinal rows of large vertical teeth at center and some smaller vertical teeth at sides, arch complete; spermathecal common duct striated but without rugosities near the junction with individual ducts; individual spermathecal ducts shortest than spermathecae (Young & Duncan 1994; Galati 2003).

Material examined. MEXICO: CHIAPAS: Guadalupe Miramar: 12-viii-2009, 1 ♂; 11-viii-2010, 1 ♂; 17-xi-2010, 4 ♂; 18-xi-2010, 1 ♂; 03-xii-2010, 1 ♀; 19-i-2011, 1 ♀; 20-i-2011, 1 ♀. Loma Bonita: 20-ii-2010, 2 ♀; 19-xi-2010, 1 ♂. Collected with CDC light traps.

Additional material collected with Magoon traps. MEXICO: CHIAPAS: Guadalupe Miramar, 08-xii-2009, 1 ♀; 17-xi-2010, 3 ♀.

Distribution. BELIZE, GUATEMALA, HONDURAS, NICARAGUA, COSTA RICA, PANAMA, COLOMBIA, SURINAME, FRENCH GUYANA, ECUADOR, BRAZIL (Young & Duncan 1994), and now in MEXICO (Chiapas).

Remarks. This is the first record of *Psychodopygus bispinosus* in Mexico. The male is very easy to distinguish based on the gonostyli; however, to recognize the female it is necessary to measure the relative length of spermathecal ducts. Female feeding habits are unknown but apparently they are not anthropophilous.

Psychodopygus corossoniensis* (LePont & Pajot, 1978), series *guyanensis

(Figures 17–20)

Lutzomyia (Psychodopygus) corossoniensis Le Pont & Pajot, 1978: 224 (♂). Type locality: French Guiana, near Corossony.

Additional references: Murillo & Zeledón, 1985: 64 (Costa Rica record); Young & Duncan, 1994: 571 (references, taxonomy, distribution).

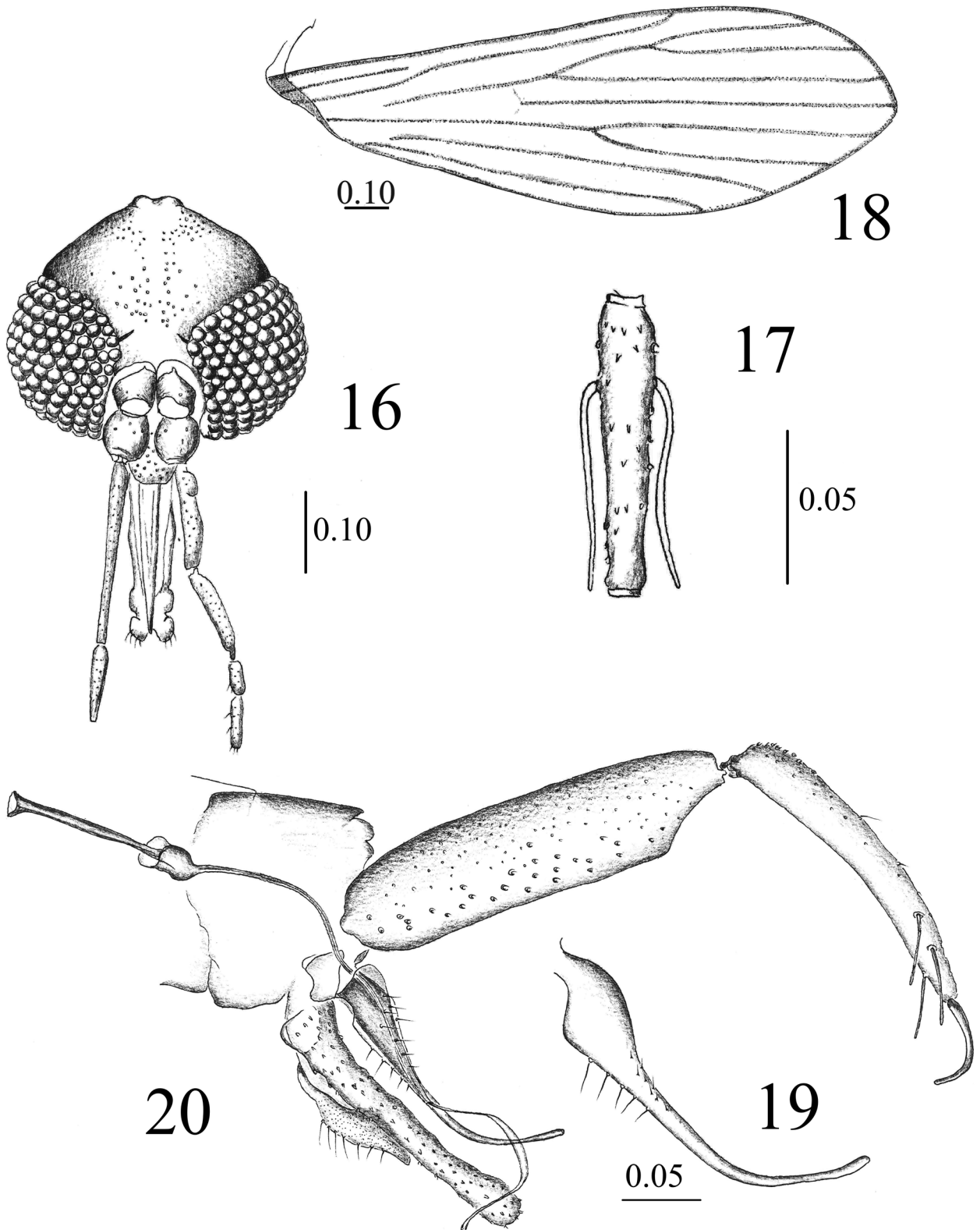
Lutzomyia guyanensis (Floch & Abonnenc, 1941), in part: Young, 1979: 186 (Panama record).

Psychodopygus corossoniensis (LePont & Pajot): Le Pont & Desjeux, 1982: 281 (*cf.* to *dorlinsis*); Biancardi *et al.*, 1982: 168 (Brazil); Ryan, 1986: 123 (♂, ♀, Brazil); Galati, 2003: 45, 120, 122 (list, keys).

Diagnosis. Male: paramere simple but curved, directed to gonocoxite, with apex slightly dilatated; lateral lobe shortest than gonocoxite; gonostylus with one large terminal spiniform seta and 3 shorter preapical setae. Female: cibarium with 4 horizontal teeth, similar to other *Psychodopygus* species; spermathecal individual ducts rugose, 2.0 times or more the length of spermatheca, the common duct completely striated (Young & Duncan 1994, Galati 2003).

Material examined. Collected with CDC light traps. MEXICO: CHIAPAS: Guadalupe Miramar, 12-viii-2009, 3 ♂; 20-x-2010, 1 ♂; 18-xi-2010, 2 ♂; 05-xii-2010, 1 ♀; 23-i-2011, 2 ♀.

Collected with Magoon traps. MEXICO: CHIAPAS: Guadalupe Miramar: 11-viii-2009, 1 ♀; 03-xii-2010, 1 ♀. Loma Bonita, 18-ii-2010, 1 ♀.



FIGURES 16–20. *Psychodopygus corossoniensis* (LePont & Pajot, 1978), male. 16) Head, frontal view; 17) Flagellomere 2; 18) Wing; 19) Paramere; 20) Terminalia, lateral view. Scales in millimeters.

Distribution. COSTA RICA, PANAMA, SURINAME, FRENCH GUIANA, BRAZIL (Young & Duncan 1994, Galati 2003), and now MEXICO (Chiapas).

Remarks. This is the first record of *Ps. corossoniensis* in Mexico, and the northernmost of its distribution. Female are not possible to separate from that of *Psychodopygus geniculatus* (Mangabeira 1941), *Ps. guyanensis* (Floch & Abonnenc 1941), and probably *Ps. dorkinsis* (LePont & Desjeux 1982). Few specimens of this species were collected in this study. Half of them were captured in CDC light traps at transects in the ever-green forest; the rest were collected in CDC light traps within communities outside houses or with a Magoon trap in the locality periphery.

Psychodopygus panamensis* (Shannon, 1926), series *panamensis

Phlebotomus panamensis Shannon, 1926: 192 (♂). Type locality: Panama, Canal Zone.

Phlebotomus (Shannonomyia) panamensis Shannon: Dyar, 1929: 117.

Phlebotomus (Shannonomyia) panamensis Shannon: Fairchild & Hertig, 1951: 405.

Psychodopygus (Psychodopygus) panamensis (Shannon): Forattini, 1971: 105; Forattini, 1973: 393.

Lutzomyia (Psychodopygus) panamensis (Shannon): Martins *et al.*, 1978: 43 (catalogue, distribution); Young & Duncan, 1994: 579 (complete references, taxonomy, distribution); Rebollar-Téllez *et al.*, 2004: 285 (Campeche records); Rebollar-Téllez *et al.*, 2005: 197 (Campeche abundance data), May-Uc *et al.*, 2011: 279 (Quintana Roo abundance data).

Psychodopygus panamensis (Shannon): Galati, 2003: 121, 123 (as series *panamensis*, list, keys); Ibáñez-Bernal *et al.*, 2011: 36 (Veracruz records).

Diagnosis. Pronotum, katapimeron, and coxae pale, scutum dark; anepimeral setae absent. Male: paramere ventral lobe with two tufts of blade-like setae, apical lobe with two large setae, one preapical and one apical; gonostylus with 3 strong and one weak spiniform setae originated in the apical tirth; Female: cibarium with 4 horizontal teeth and a transverse row of vertical teeth plus longitudinal median rows of markedly enlarged vertical teeth; spermathecae with asymmetrical terminal annulation, clearly longer than individual spermathecal duct; common spermathecal duct smooth below rugose portion (Young & Duncan 1994, Galati 2003).

Material examined. Collected with CDC light traps. MEXICO: CHIAPAS: Guadalupe Miramar, 19-vi-2009, 1 ♀; 12-viii-2009, 3 ♂; 04-ix-2009, 1 ♂; 05-ix-2009, 2 ♂; 21-x-2009, 1 ♀; 09-xii-2009, 1 ♀; 13-i-2010, 1 ♀; 14-i-2010, 1 ♀; 16-ii-2010, 2 ♂; 17-ii-2010, 3 ♂, 4 ♀; 18-ii-2010, 2 ♀; 21-ii-2010, 2 ♀; 17-iii-2010, 1 ♀; 18-iii-2010, 7 ♀; 19-iii-2010, 1 ♂; 16-vi-2010, 1 ♀; 17-vi-2010, 1 ♂; 20-vi-2010, 1 ♀; 08-vii-2010, 1 ♀; 10-vii-2010, 2 ♀; 19-x-2010, 3 ♂; 20-x-2010, 9 ♂; 21-x-2010, 10 ♂; 17-xi-2010, 144 ♂; 18-xi-2010, 109 ♂; 19-i-2011, 1 ♂, 1 ♀; 20-i-2011, 3 ♂, 2 ♀; 08-ii-2011, 1 ♂, 7 ♀; 09-ii-2011, 2 ♀; 10-ii-2011, 4 ♀. Loma Bonita: 14-viii-2009, 2 ♀; 02-ix-2009, 1 ♂; 20-x-2009, 1 ♂; 19-ii-2010, 3 ♂, 4 ♀; 20-ii-2010, 2 ♀; 21-ii-2010, 1 ♂, 4 ♀; 20-iii-2010, 1 ♀; 16-vi-2010, 1 ♀; 22-x-2010, 2 ♂; 24-x-2010, 4 ♂, 1 ♀; 18-xi-2010, 2 ♂; 19-xi-2010, 3 ♂, 1 ♀; 21-xi-2010, 1 ♂; 22-i-2011, 1 ♀; 12-ii-2011, 1 ♂. San Antonio Buena Vista: 13-vii-2010, 1 ♂.

Collected with Magoon trap. MEXICO: CHIAPAS: Guadalupe Miramar: 16-vi-2009, 3 ♀; 18-vi-2009, 1 ♀; 11-viii-2009, 1 ♀; 13-viii-2009, 1 ♀; 14-viii-2009, 1 ♀; 13-viii-2010, 2 ♀; 19-viii-2010, 1 ♀; 19-xi-2010, 2 ♀; 20-xi-2010, 1 ♀. Loma Bonita: 20-ii-2010, 1 ♀; 23-x-2010, 1 ♀.

Distribution. MEXICO (Campeche, Chiapas, Quintana Roo, Tabasco, Veracruz) (Ibáñez-Bernal 2003; Ibáñez-Bernal 2005), BELIZE, GUATEMALA, HONDURAS, NICARAGUA, COSTA RICA, PANAMA, COLOMBIA, VENEZUELA, FRENCH GUIANA, ECUADOR, BRAZIL (Young & Duncan 1994), PERU (Cáceres & Galati 2001, Galati 2003).

Remarks. This is an anthropophilous species and has been found infected with *Leishmania panamensis* (Christensen *et al.* 1983) and *Leishmania braziliensis* (Rowton *et al.* 1991). Natural infection with *Le. mexicana* has been reported by Pech-May *et al.* (2010) in the Mexican state of Campeche. In our collections, *Psychodopygus panamensis* was the most abundant species.

Nyssomyia Barretto, 1962

Lutzomyia (Nyssomyia) Barretto, 1962: 98. Type species: Phlebotomus intermedius Lutz & Neiva, by original designation).

Additional references: Lewis *et al.*, 1977: 325; Martins *et al.*, 1978: 94 (defined); Ready & Fraiha, 1981: 705 (defined, key).

Lutzomyia species group *intermedia* Theodor, 1965: 184 (defined).

Psychodopygus (Trichophoromyia) Barretto, 1962: Forattini, 1971a: 105 (in part); Forattini, 1973: 415 (in part).

Nyssomyia Barretto (as genus): Artemiev, 1991: 73; Galati, 1995: 137; Galati, 2003: 46, 74, 123, 125 (key).

Nyssomyia (*Bichromomyia*) Artemiev, 1991: 73. Type species: *Phlebotomus flaviscutellatus* Mangabeira, by original designation).

Diagnosis. Clypeus shortest than eyes; antennal flagellomere 1 with a preapical papilliform sensilla; ascoids simple. Palpus segment 2 without Newstead sensillae; palpus segment 5 usually shorter than palpal segment 3; katepisternum without setae on anterior margin; Male: terminalia small, shorter than thorax; gonocoxite usually without persistent setae; gonostylus with 4 long spiniform setae, none of which is inserted on a long tubercle or process, the apical spiniform setae as long as gonostylus; paramere simple only with simple setae. Female: lacinia usually with two rows of teeth externaly; cibarium with 6 or more horizontal teeth, arch complete; spermatheca with 5 to 15 annuli, the apical annulus about as long as the preapical one, terminal capitulum large (Young & Duncan 1994, Galati 2003).

Remarks. This genus currently includes approximately 16 species, with four species distributed in Central America and only one reaching the southern portion of Mexico.

Nyssomyia ylephiletor (Fairchild & Hertig, 1952)

Phlebotomus ylephiletor Fairchild & Hertig, 1952: 520 (♂, ♀). Type locality: Panama, Bocas del Toro, Almirante. Additional references: Fairchild & Hertig, 1959: 122 (distribution).

Phlebotomus olmecus Vargas & Díaz-Nájera, 1959: 147 (in part, female description correspond to *Ny. ylephiletor*).

Lutzomyia (*Nyssomyia*) *ylephiletrix* (Fairchild & Hertig): Barretto, 1962: 98 (list).

Lutzomyia ylephiletrix (Fairchild & Hertig) species group *Intermedia*: Theodor, 1965: 184 (list).

Psychodopygus (*Trichophoromyia*) *ylephiletor* (Fairchild & Hertig): Forattini, 1971a: 106 (listed); Forattini, 1973: 123 (taxonomy, distribution).

Lutzomyia (*Nyssomyia*) *ylephiletor* (Fairchild & Hertig): Martins *et al.*, 1978: 103 (references, distribution); Young, 1979: 162 (references, distribution); Ready & Fraiha, 1981: 709 (key); Zeledón *et al.*, 1982: 276 (Honduras record); Christensen *et al.*, 1983: 466 (abundance, Panama); Murillo & Zeledón, 1985: 55 (Costa Rica records); Young & Duncan, 1994: 462 (references, taxonomy, distribution); Rebollar-Téllez *et al.*, 2004: 285 (Campeche, record), Rebollar-Téllez *et al.*, 2005: 197 (Campeche abundance data).

Nyssomyia ylephiletor (Fairchild & Hertig): Galati, 2003: 46, 124, 125 (list, keys).

Diagnosis. Mesonotum dark, pronotum and paratergite pale; Male: gonostylus with 2 terminal spines close together, separated by distance similar to greatest width of terminal spine, proximal 2 spines inserted at same level and middle one-third of article; genital filaments shorter than 2X apodeme + pump length; Female: spermatheca with 5 to 7 annuli, basal annuli smaller than distal annuli, and capitulum as wide as its terminal annulus; individual spermathecal ducts shorter than 2X length of spermatheca, without sclerotized rugosities (Young & Duncan 1994, Galati 2003).

Material examined. Collected with CDC light traps. MEXICO: CHIAPAS: Guadalupe Miramar: 12-viii-2009, 1 ♂; 20-iv-2010, 1 ♀; 01-xii-2010, 1 ♂. Loma Bonita: 19-ii-2010, 1 ♀; 20-ii-2010, 1 ♀; 19-iii-2011, 1 ♀; 20-iii-2010, 1 ♀; 24-x-2010, 1 ♂. San Antonio Buena Vista: 28-iii-2010, 1 ♀.

Distribution. MEXICO (Campeche, Chiapas, Tabasco) (Rebollar-Téllez *et al.* 2004, Ibáñez-Bernal, 2005), BELIZE, GUATEMALA, HONDURAS, NICARAGUA, COSTA RICA, PANAMA, COLOMBIA (Young & Duncan 1994, Galati 2003).

Remarks. This species is antropophilous and has been found infected with *Leishmania mexicana* in Guatemala (Porter *et al.* 1987). It is also suspected as a vector of *Leishmania panamensis* in Panama (Christensen & Herrer 1973). One female of this species (out of eight females examined), was found positive (12.5%) for *Le. mexicana* infection in the Mexican state of Campeche. The actual role of this species as a vector is hitherto unknown (Pech-May *et al.* 2010).

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