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THE *MICROPS* GROUP OF *LUTZOMYIA* FRANÇA WITH DESCRIPTIONS OF TWO NEW SPECIES FROM SOUTH AMERICA (DIPTERA: PSYCHODIDAE: PHLEBOTOMINAE)

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Six species of phlebotomine sand flies in the genus Lutzomyia *França from South America are included in the newly-created species group* microps. *References and illustrations of the species are given, including descriptions of two new forms* – L. nematoducta *n.sp., male and female from northern Brazil, and* L. preclara *n.sp. male from Colombia and Peru. The males in the species group* microps *are keyed.*

The *Lutzomyia* sand flies treated here are known from South America in Colombia, French Guiana, Peru, Bolivia, and Brazil from relatively few specimens. Previously, *L. microps* (Mangabeira), *L. fluviatilis* (Floch & Abonnenc), *L. servulolimai* (Damasceno & Causey) and *L. pennyi* (Arias & Freitas) were treated as isolated species or as questionable members of the *migonei* group (Theodor, 1965; Martins, Williams & Falcão, 1978; Arias & Freitas, 1982). Aside from the observation by Martins, Falcão & Silva (1975) that the females of *L. microps* and *L. fluviatilis* are structurally indistinguishable, there are no other reports suggesting a close relationship among the species. Forattini (1973) places two species in the genus *Psychodopygus* Mangabeira while retaining the other, *L. servulolimai*, in *Lutzomyia.*

It is apparent now that these four species and two others described here share a unique combination of characters. Accordingly, we propose to include them in the *microps* group, a new informally named category, equivalent in rank to other species groups of *Lutzomyia* (Lewis et al., 1977).

The species in the *microps* group are recognized by the following features: color pale to light brown, without contrasting dark mesonotum. Head broad with small eyes, short labrum and long to very long flagellomeres (unlike species in the subgenus *Trichophoromyia* in the sense of Sherlock & Guitton, 1970). Palp 5 shorter than or subequal to palpomeres 3 + 4. Female cibarium with 4 horizontal teeth, inner pair separated by a wide gap and with few or no vertical teeth; pigment patch faintly infuscated or invisible; cibarial arch strongly developed only at sides. Wing venation with short *beta*, less than half *alpha. Genitalia.* Male style bearing 4 large spines, no subterminal seta. Inner coxite base with simple or blade-like setae inserted on a tubercle or not; paramere simple; genital filament tips pointed, simple. Female spermathecae cylindrical with incomplete or complete annuli, long to very long individual ducts and short common duct.

The inclusion of *L. nordestina* (Mangabeira) and an undescribed ally from northern Brazil (♀ only, Young, 1979) in this group could be justified on the basis of most characters except that the *L. nordestina* male lacks a coxite setal tuft. This may or may not prove to be significant but, for the present, we exclude the two species from the *microps* group.

The *microps* group males resemble those in the subgenus *Lutzomyia* having 4 spines on the style (series *longipalpis* and *cruciata*). Fairchild (1955), in fact, includes *L. fluviatilis* with the *cruciata* group species but it, and others in the *microps* group, have relatively long fifth palpomeres. Males in the series *longipalpis* also have a subterminal bristle on each style, absent in those of the *microps* group. Nonsexual characters of the females (notably the broad heads, long antennae and short labrums) are especially useful in distinguishing the microps group females from others with similar cibarial armatures and spermatheca (e.g. *vexator* group spp.). The feeding habits of the species in the *microps* group remain unknown.

Microps group species:

1. *Lutzomyia microps* (Mangabeira) Fig. 1-4.

Phlebotomus microps Mangabeira, 1942: 169 (♂, Fazenda do Surdo, município de Nova Iguaçu, Rio de Janeiro, Brazil).

Lutzomyia microps: Theodor, 1965: 182 (listed). Martins, Falcão & Silva, 1975: 259-261 (♀ descript., distrib., figs.). Martins, Williams & Falcão, 1978: 163 (distrib.).

Psychodopygus microps: Forattini, 1973: 473-474 (♂ fig., brief redescript.).

Distribution: Brazil (Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo, Santa Catarina).

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Figs. 1-4: *Lutzomyia microps* ♂ . Serra do Cuiabá, Minas Gerais, Brazil – 1: genitalia, lateral view; 2: head; 3: wing; 4: genital filaments and pump. Figs. 5-8: *Lutzomyia servulolimai* ♂ holotype, sketched at U.S. National Museum, not drawn to same scale as others – 5: genital filaments and pump; 6: genitalia; 7: wing; 8: antenna base and palpi. Figs. 9-10: *Lutzomyia* sp. ♀ . Vichada, Colombia – 9: cibarium, same scale as Fig. 10; 10: spermathecae.

Material examined: Brazil. 2♀♀ Serra do Cuiabá, município de Sabará, Minas Gerais, 4-I-1958 (A.V. Martins).

Remarks: This species is poorly known. Its geographic distribution is apparently restricted to southeastern Brazil where specimens have been found in small numbers in rock crevices near small streams (Martins, Falcão & Silva, 1975).

2. *Lutzomyia servulolimai* (Damasceno & Causey). Fig. 5-8.

Phlebotominus servulolimai Damasceno & Causey, 1945:635 (♂ , Bom Jesus, São Domingos, Pará, Brazil).

Lutzomyia servulolimai: Theodor, 1965:182 (listed). Martins, Falcão & Silva, 1965:3 (Rondônia Territory, Brazil, ♀♀ captured). Llanos, 1973:29 et seq. (♂, Peru, figs.). Forattini, 1973:348 et seq. (brief redescrip. ♂ , fig.). Martins, Williams & Falcão, 1978:167-168 (distrib.).

Distribution: Brazil (Amazonas, Pará, Rondônia); Peru (Loreto); Bolivia (Beni).

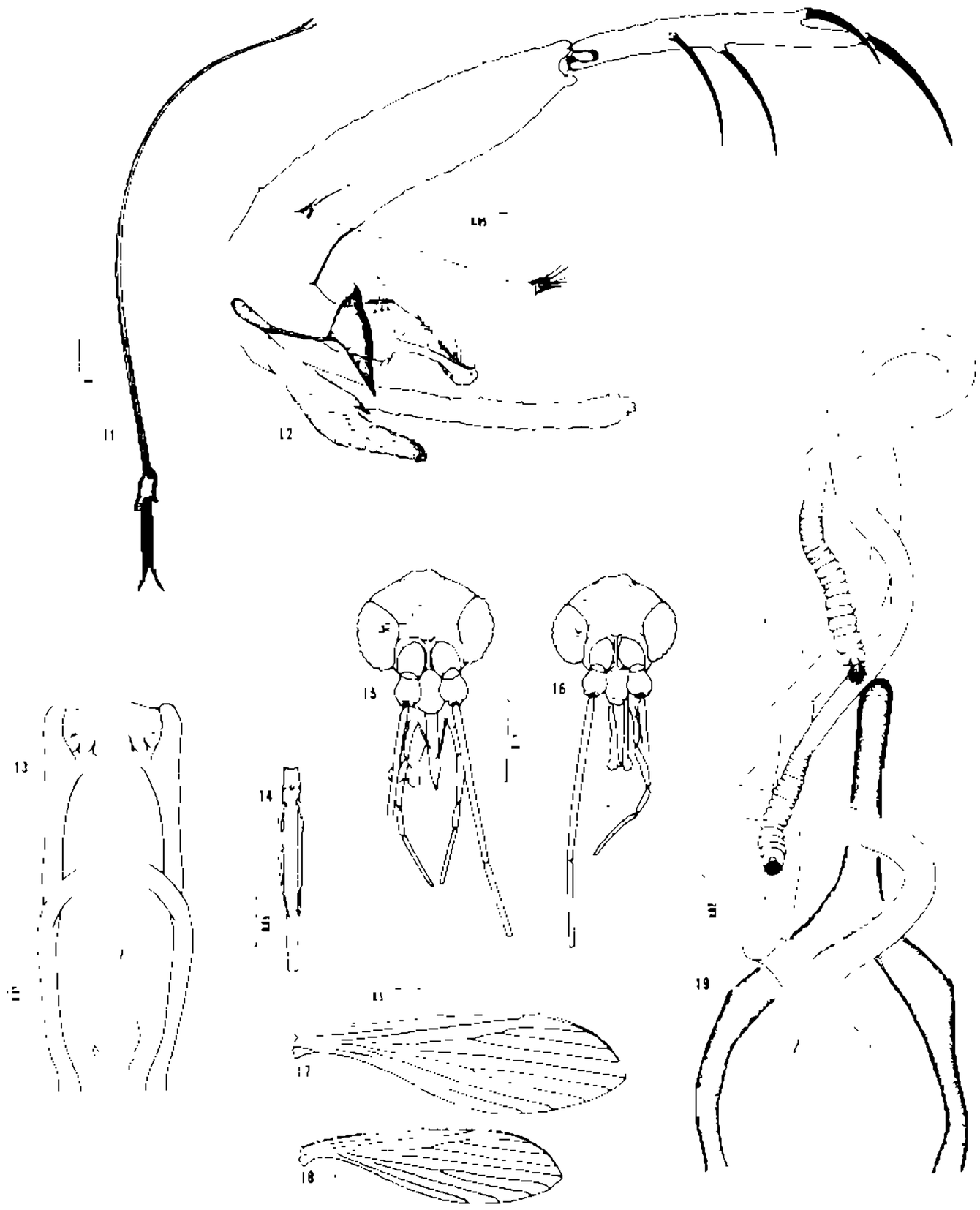
Material examined: *Brazil.* ♂ holotype (USNM); 1 ♂ , BR-319 at Km. 275, Amazonas, 18-X-1979, light trap, J.R. Arias. *Bolivia.* Guayaramerin, Beni, tree trunk, J. Velasco.

Remarks: Aside from the longer and slightly thicker coxite setae of the males from Amazonas, Brazil and Beni, Bolivia, the specimens closely resemble the *servulolimai* holotype.

A female sand fly (Figs. 9, 10) from Cumariana, Vichada, Colombia, in the collection of the Instituto Nacional de Salud, Bogotá, clearly belongs in the *microps* group. Its specific identity remains uncertain although it may represent the undescribed female of *servuloliami* or, less likely, that of *L. preclara* n.sp. which probably has longer sperm ducts.

Some measurements are observed of the partly damaged female (no. 648) are as follows: wing length 1.69; width 0.49 (wing wrinkled). Color pale. Cibarium (Fig. 9) with 4 horizontal teeth, a few ill-defined vertical teeth as shown; cibarial arch prominent at sides, diffuse in middle; pigment patch barely

visible. Pharynx unarmed. Eyes small (like *L. nordestina*). Length of flagellomere I, 0.35; II, 0.16; III, 0.17. Labrum 0.16 long. Length of palpal segments: 1, 0.03; 2, 0.78; 3, 0.96; 4, 0.07; 5, 0.13. Length of wing vein sections: *alpha*, 0.47; *beta*, 0.17; *delta*, 0.15; *gamma*, 0.29. Legs missing. Spermathecae (Fig. 10) as shown.



Figs. 11-19: *Lutzomyia fluviatilis* ♂ , Paramana, Fr. Guiana; ♀ , Maripasoula, Fr. Guiana – 11: genital filaments and pump; 21: genitalia (isolated drawing of 5 coxite setae on tubercle drawn from a male, from Pará, Brazil); 13: ♀ cibarium; 14: ♂ flagellomere II; 15: ♀ head; 16: ♂ head; 17: ♀ wing; 18: ♂ wing; 19: spermathecae.

3. *Lutzomyia fluviatilis* (Floch & Abonnenc). Figs. 11-19.

Phlebotomus fluviatilis Floch & Abonnenc, 1944a:7 (♂ , Canori, French Guiana); 1944b:1 (♀ descript.).

Lutzomyia fluviatilis: Theodor, 1966:196 (listed). Lewis, 1975: 503 et seq. (mouthpart morphol., keyed). Leger et al., 1977: 218, 227 (collection data, French Guiana). Martins, Williams & Falcão, 1978: 163 (distrib.).

Psychodopygus fluviatilis: Forattini, 1971:105 (listed); 1973:416 et seq. (♂ , ♀ figs., brief re-descript.).

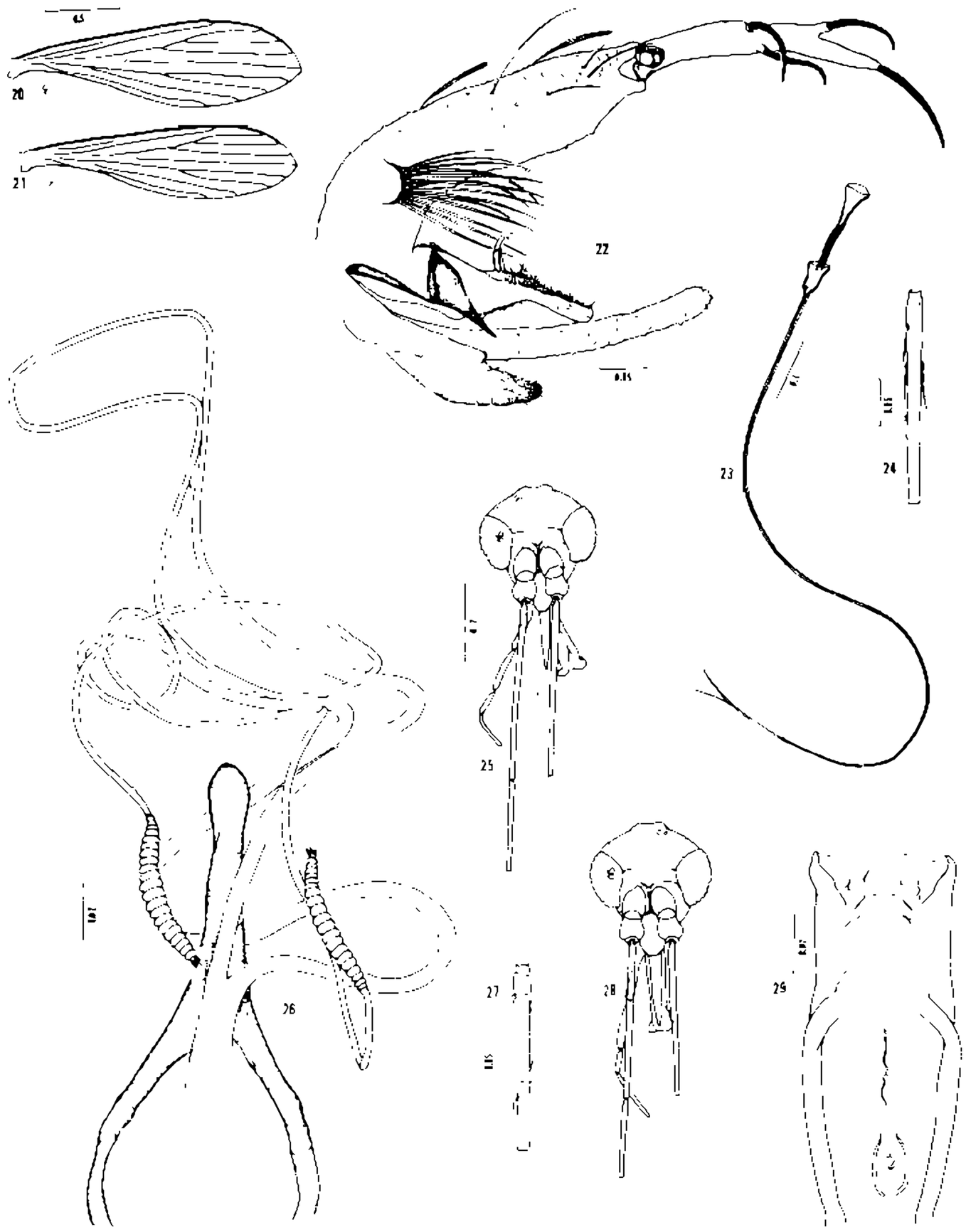
Distribution: French Guiana and Brazil (Pará).

Material examined: *French Guiana.* 1 ♂ , 2 ♀♀ , Maripassoula, III-1973, light traps, N. Leger. 1 ♂ , Paramana, 24-X-1975, light trap, N. Leger. *Brazil.* 1 ♂ , 1 ♀ , Rio Jari, Pará, 21-VIII-1981 and 31-X-1981, light trap, P. Ready.

Remarks: There seems to be little doubt about the correct association of the *fluviatilis* sexes. Similar morphology, color, and recent collecting data in French Guiana provide enough evidence to support the association.

We did not observe a dark pigment patch in the cibarium of the 3 females examined. In fact, the pigment patch was barely visible, similar to that of *L. microps*, described by Martins, Falcão & Silva (1975), and *L. nematoducta* n.sp. The individual sperm ducts of *fluviatilis*, observed in liquid phenol, become narrow towards the base of the spermathecae (Fig. 19).

The specimens from Pará, Brazil are indistinguishable from those from French Guiana except the male has 5, instead of 2, setae at the coxite base.



Figs. 20-29: *Lutzomyia nematoducta* n.sp. ♂ and ♀ , Amazonas, Brazil – 20: ♀ wing; 21: ♂ wing; 22: genitalia; 23: genital pump and filaments; 24: ♂ flagellomere III; 25: ♂ head; 26: spermathecae; 27: ♀ flagellomere II; 28: ♀ head; 29: ♀ cibarium.

4. *Lutzomyia nematoducta* Young & Arias, n.sp. Fig. 20-29.

Holotype ♂ . Measurements in milimeters. Wing length 1.83; width 0.51. Color pale except for moderately infuscated external genitalia. Head height from vertex to tip of clypeus 0.34; width 0.31. Eyes small, separated by 0.12 or by distance = to 6.7 facet diameters. Flagellomere I very long, 0.45; II + III = 0.45; ascoids on II ending before apex of flagellomere; present on I-X (XI-XIV missing). Labrum 0.15 long. Length of palpal segments: 1, 0.037; 2, 0.075; 3, 0.116; 4, 0.073; 5, 0.136; palpal sensilla (6-8) at apical third of segment 3. Cibarium without teeth; pigment patch slender, nearly invisible; cibarial arch conspicuous at sides, diffuse in middle. Pharynx 0.14 long, unarmed. Pleura with 13-14 upper and 1-2 lower episternal setae. Length of wing vein sections: *alpha*, 0.44; *beta*, 0.16; *delta*, 0.11; *gamma*, 0.31. Length of femora, tibiae and basitarsi: foreleg, 0.85, 1.07, 0.69; midleg, 0.83, 1.30, 0.73; hindleg, 0.90, 1.50, 0.83. *Genitalia*. Style 0.25 long with 4 major spines, isolated spine at 0.76 of segment, no subterminal bristle. Coxite 0.37 long with a basal tuft of 12-14 blade-like setae on a well-marked tubercle. Paramere simple with 3-4 curved dorsobasal setae distinct from others. Aedeagus 0.12 long, subtriangular with pointed tip, well sclerotized. Genital pump 0.18 long, each filament 1.14 long or 6.3X length of pump. Lateral lobe 0.37 long.

Allotype ♀ . Wing length 1.91; width 0.56. Coloration as for ♂ . Head height 0.35; width 0.31. Eyes separated by 0.13 or by distance = to 7.1 facet diameters. Flagellomere I, 0.39 long; II + III = 0.41; ascoids on II longer than for ♂ but not reaching end of flagellomere, on all flagellomeres except last (XIV). Labrum 0.18 long. Length of palpal segments: 1, 0.037; 2, 0.076; 3, 0.126; 4, 0.076; 5, 0.13; palpal sensilla (7) at distal third of segment 3. Cibarium with 4 inwardly pointed horizontal teeth with a wide gap between inner pair, 2-3 small vertical teeth, nearly invisible, in 2 groups just anterior of inner pair of horizontal teeth; subtriangular pigment patch slightly pigmented; arch prominent at sides, diffuse in middle. Pharynx 0.15 long, unarmed. Pleura with 16-19 upper and 1-2 lower episternal setae. Length of wing vein sections: *alpha*, 0.52; *beta*, 0.15; *delta*, 0.20; *gamma*, 0.30. Length of femora, tibiae and basitarsi: foreleg, 0.88, 1.05, 0.66; midleg, 0.86, 1.22, 0.74; hindleg, 0.88, 1.40, 0.82. Spermathecae slender with about 20 annulations, middle third wider than basal or distal thirds; common duct apparently shorter than spermathecae but basal opening invisible; individual ducts exceedingly long, at least 12X length of spermathecae or common duct.

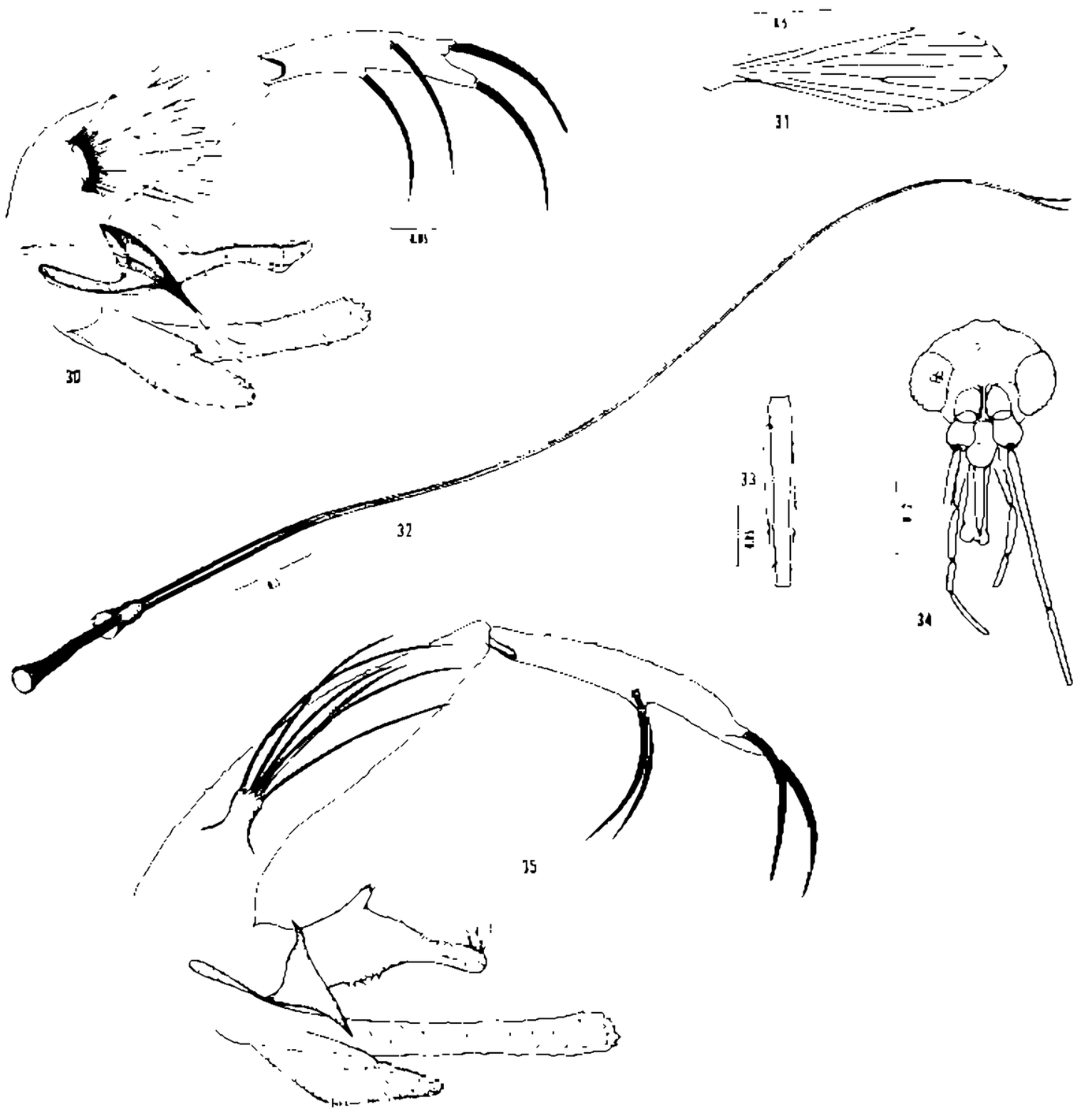
Type Data: *Holotype* ♂. 26Km. E. of Manaus, Amazonas, Brazil, at Reserva Ducke, 17-18-III-1979, flight trap in forest, D. Young. *Allotype* ♀. Same data except 43Km. N. of Manaus, light trap, 23-III-1979. *Paratypes*. 1 ♂, 1 ♀, same data as for holotype but ♂ in light trap. 1 ♀, 245Km. E. of Manaus near Rio Urubu, 13-III-1979, flight trap, J. Arias and D. Young. 20 ♂♂, Reserva Ducke, various dates in 1977-1978, light traps, J. Arias, R. Freitas and J. Vidal. 6 ♂♂, 4 ♀♀, 24Km. E. of Manaus, Amazonas, Brazil, light trap, various dates in 1981, J. Arias, R. Freitas & J. Vidal. 34 ♂♂, 30 ♀♀, Parque das Laranjeiras, Manaus, Amazonas, Brazil, light trap, various dates, 1981, J. Arias, R. Freitas.

Holotype and allotype to be deposited in the Museu de Zoologia, Universidade de São Paulo, Brazil. Paratypes in collections at INPA, Manaus; U.S. National Museum (Nat. Hist.), Washington, D.C., and Florida State Collection of Arthropods, Gainesville, Florida.

Discussion: The male of *L. nematoducta* resembles that of *fluviatilis* but several features are strikingly different. The brush-like coxite tuft of *nematoducta* consists of about 12 thick setae inserted on a broad tubercle; whereas there are only 2 to 5 thin setae on a small tubercle in the other male. The parameres of the 2 males are quite similar in shape but the curved dorsal setae at the paramere base of *nematoducta* are more strongly developed. The genital filaments of *fluviatilis* are relatively short, about 4X the length of the pump. Those of *L. nematoducta* and *L. preclara*, a species with different parameres, are longer than 6X the pump.

Some of the males in the subgenus *Lutzomyia*, series *longipalpis*, may be confused with the *nematoducta* male but they have a subterminal bristle on each style and the fifth palpal segment is relatively long.

From the female of *L. fluviatilis*, that of *nematoducta* differs in having thinner and longer sperm ducts and more slender spermathecae. These species and *L. microps* apparently have allopatric distributions.



Figs. 30-34: *Lutzomyia preclara* n.sp. ♂, Leticia, Colombia – 30: genitalia; 31: wing; 32: genital filaments and pump; 33: flagellomere II; 34; head. Fig. 35 – *Lutzomyia pennyi* ♂, Amazonas, Brazil – Genitalia, drawn at same scale as Fig. 30.

5. *Lutzomyia preclara* Young & Arias, n.sp. Fig. 30-34.

Holotype ♂. Wing length 1.67; width 0.47. Color pale except for faintly pigmented external genitalia. Head height 0.32; width 0.30. Eyes separated by 0.12 or by distance = to 6.7 facet diameters. Flagellomere I, 0.35 long, II = 0.16, remainder missing; ascoids on II simple as shown, 2 smaller ascoid-like structures visible near end of flagellomere II. Labrum 0.15 long. Length of palpal segments: 1, 0.03; 2, 0.06; 3, 0.11; 4, 0.07; 5, lost after drawing but about 0.12mm; palpal sensilla (about 10) on middle third of palp 3. Cibarium without teeth or pigment patch; arch nearly complete, diffuse in middle. Pharynx 0.13 long, unarmed. Pleura with 10 upper and 2 lower episternal setae. Length of wing vein sections: *alpha*, 0.30; *beta*, 0.13; *delta*, 0.10; *gamma*, 0.30. Length of femora, tibiae and basitarsi: foreleg missing; midleg, 0.68, 1.10, 0.63; hindleg, 0.80, 1.27, 0.60. *Genitalia.* Style 0.20 long with 4 major spines, basal spine isolated,

no subterminal bristle. Coxite 0.24 long with about 20 long pointed setae, the lower ones thicker than dorsal ones, all inserted on broad, well-pigmented tubercle. Paramere simple with all dorsal setae straight and pointed, ventral margin concave, tip rounded and slightly upturned. Aedeagus pointed downwards, slender towards tip, well-pigmented throughout. Genital pump 0.17 long, very dark; each filament 1.15 long or 6.7X length of pump, heavily infuscated, especially section near pump. Lateral lobe 0.27 long.

Type Data: *Holotype* ♂ . 9 Km. N. of Leticia, Amazonas, Colombia, 3-5-VI-1979, flight trap, R.C. Wilkerson. *Paratype* ♂ . 30Km. SW. of Puerto Maldonado, Madre de Dios, Peru, I-XI-1982, flight trap, R.C. Wilkerson. Specimens to be deposited in U.S. National Museum (Nat. Hist.). The species name refers to the Latin word meaning very beautiful or splendid.

Discussion: The shape of the parameres of *L. preclara* readily distinguishes this species from males of *fluviatilis* and *nematoducta*. *L. microps* and *servulolimai* have fewer, thinner setae at the base of the coxite. The relatively short fifth palpal segment of *preclara* serves to separate it from *L. gomezi* (Nitz.), *L. marinkellei* Young and other species in the subgenus *Lutzomyia*, series *cruciata*.

6. *Lutzomyia pennyi* Arias & Freitas. Fig. 35.

Lutzomyia pennyi Arias & Freitas, 1982:847 (♂ , 24Km. E. of Manaus, Amazonas, Brazil).

Distribution: Brazil (Manaus).

Material examined: *Brazil.* ♂ holotype and 5 ♂ paratypes from type locality and from one site 133Km. E. of Manaus, Amazonas.

Remarks: *Lutzomyia pennyi* has been taken only in light trap collections and is considered a rare species near Manaus, Brazil. The female is unknown.

KEY TO MALES IN THE SPECIES GROUP *MICROPS*

1. Coxite with 6 or more persistent setae at inner base 2
   Coxite with 2-5 persistent setae at inner base. *L. fluviatilis* (Fig. 12)

2. Genital filaments at least 6X length of genital pump 3
   Genital filaments 5X length of pump or shorter 5

3. Paramere with either a dorsal setiferous projection or relatively thick curved setae near middle of structure 4
   Paramere simple, without a dorsal setiferous projection or modified setae . . . . . *L. preclara* n.sp. (Fig. 30)

4. Coxite tuft of 6-8 long setae. Paramere with a short dorsal projection bearing apical setae . . . . .
   L. pennyi (Fig. 35)
   Coxite tuft of 12-14 shorter setae. Paramere without a dorsal projection but with 3-4 curved setae near middle of structure. *L. nematoducta* n.sp. (Fig. 22)

5. Paramere relatively broad, its shape as in Fig. 6 . . . . . *L. servulolimai* (Fig. 6)
   Paramere more slender, shaped otherwise . . . . . *L. microps* (Fig. 1)

RESUMO

Seis espécies de flebotomíneos no gênero *Lutzomyia* França da América do Sul são incluídos no grupo de espécies *microps* estabelecido aqui. Referências e ilustrações são dadas, incluindo a descrição de duas novas espécies – *L. nematoducta* n.sp., macho e fêmea do Norte do Brasil, e *L. preclara* n.sp. macho da Colômbia e do Peru. Uma chave para diferenciar os machos do grupo de espécies *microps* é apresentada.

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