

Description of *Lutzomyia (Pifanomyia) robusta* n. sp. (Diptera, Psychodidae, Phlebotominae) from Peruvian Equadorean interandean areas

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Description of *Lutzomyia robusta*, n. sp. (Diptera, Psychodidae, Phlebotominae) from interandean areas of Peru and Ecuador. *Lutzomyia robusta*, n. sp., probable vector of human bartonellosis and cutaneous leishmaniasis, is described and illustrated. This species presents strong affinity with *L. serrana* (Damasceno & Arouck, 1949) but they can be distinguished by variance analysis of four male characteristics and only one female characteristic. In the variance analysis, populations of *L. serrana*, of Amazonian areas of Brazil, Peru and Bolivia, the coast of Ecuador and other areas of Brazil were studied. The synonymy of *Lutzomyia guayasi* (Rodríguez) and *L. serrana* was corroborated.

Psychodidae, classification. Ecology, vectors.

Captures of sand flies carried out in the Region Nor-Oriental del Marañón, Peru, between 5° 3' SL - 78° 53' WL and 6° 5'30'' SL - 78° 30'29'' WL, in the provinces of San Ignacio (interandean valley of Chinchipe), Jaén (interandean valley of Chamaya and Chinchipe) and Utcubamba (right bank of River Marañón), during the period 1987 - 1992, motivated by the occurrence of an outbreak of human bartonellosis, showed the presence of five new species: two, of the subgenus *Helcocyrtomyia* Barretto (Galati & Cáceres³, 1994) and three, of the subgenus *Pifanomyia* Ortiz & Scorza; two of which latter have already been described (Galati et al⁴, 1995) and the third of which, *L. robusta*, n. sp., is the object of the present study. This species, in both sexes, is very close to *L. serrana* (Damasceno & Arouck, 1949), the differences between them being more quantitative than qualitative; hence the two species have been confused.

In the mentioned areas, in intradomiciliary captures, with light CDC trap, *L. robusta*, n. sp.

showed the greatest density and in the peridomestic, with human bait, was one of the most prevalent; this behaviour suggests its involvement in the transmission of the parasitosis. Using the same capture techniques this new species was the most frequent in the Ecuador area, near the border of Peru, in the Amazonian province of Zamora-Chinchipe, where cases of human bartonellosis were also identified and which is considered a cutaneous leishmaniasis endemic zone (Le Pont et al.⁵, 1994).

Rodríguez⁶ (1956) describes the male and female of *Phlebotomus (Brumptomyia) guayasi* from the coast of Ecuador, which has been regarded as identical with *L. serrana* by Fairchild & Hertig² (1961).

Because of the great similarity between the two species and the probable implication of this new taxon in the transmission of the above mentioned parasitoses, it is necessary to clarify its taxonomic status. With this purpose in view, some morpholog-

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ical characteristics were submitted to variance analysis, by means of a comparison of populations of *Lutzomyia robusta*, n. sp. of the interandean areas with those of the *Lutzomyia serrana* of the area-type (Amazonian Brazilian region), as well as with the Peruvian and Bolivian Amazonian areas and of other areas of Brazil and of the coast of Ecuador.

Material and Method

For the variance analysis, 8 male characteristics were observed: length: flagellomere I, labrum-epipharynx, hind tibia, R₅, genital ductus; width of the wing and paramere and ratio between length and width of paramere apical area (setal area) of two populations of *Lutzomyia robusta*, n.sp. of the interandean areas: Peru-Region Nor-Oriental (NO) and Ecuador - Zamora-Chinchipe Region (ZC) and of nine populations of *L. serrana* (except for hind tibia of the areas: Amazonian: Peru Loreto/Madre de Dios (PA), Bolivia - Pando (BO) and Brazil - Pará/Maranhão (PM), Rondônia (RO), Acre (AC), Mato Grosso (MT); Atlantic - Brazil - Bahia/Espírito Santo/Rio de Janeiro (AT) and inland areas of Brazil Minas Gerais (MG) and the coast of Ecuador (EC). For the hind tibia, the following areas were not included: BO, AC, RO, because in the specimens examined it was missing. For females, 7 characteristics were observed: length: flagellomere I, labrum-epipharynx, R₅, fore, mid and hind tibiae and wing width, in the populations of *L. robusta* of NO, ZC and only four populations of *L. serrana*: BO, MG, MT, EC.

Sclerotized characteristics, the least subject to measurement variations, were selected for observation only.

The program used was prepared by J. L. F. dos Santos, professor of Department of Epidemiology, of the Faculdade de Saúde Pública, of the Universidade de São Paulo. The confidence interval was calculated by Gabriel's formula (Sokal & Rohlf⁸, 1981), which is:

$$\text{Confidence interval} = \bar{y}_i \pm \sqrt{\frac{1}{2}} m[k^*, v] S_{y_i}$$

where: \bar{y}_i is the average values of each characteristic; m the critical value ($\alpha = 0.05$) obtained from table 21 of "Studentized range" Rolhf & Sokal⁷, 1981); S_{y_i} the standard error; k^* the n° of places of the origin and the v degrees of freedom within of the treatment.

Results

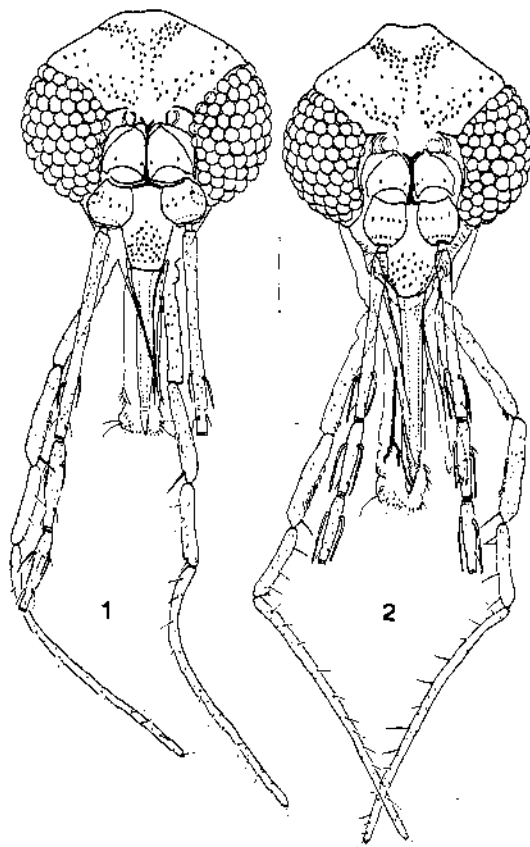
The greatest values and the overlapping of the all confidence intervals (CI) can be observed with regard to all eight characteristics submitted to variance analysis for the males of the interandean populations ZC and NO (Fig. 27).

The overlapping of the CI occurs with regard to the populations of the Amazonian region: PA, BO, AC, PM, RO, MT and those from the Atlantic area (AT) and the coast of Ecuador (EC).

The MG population presents the CI values closest to those of ZC and NO, with overlapping of the labrum-epipharynx length and wing width of the males.

By means of the R₅ length CI three population groups can be distinguished: the first covering the Amazonian and Atlantic areas and of the coast of Ecuador; the second MG and the third of the interandean region.

Besides R₅ length, the two interandean populations are distinguished from the others by their hind tibia, paramere width and ratio between length and width of the apical part of the paramere.



Figures 1 e 2 - *Lutzomyia robusta*, n. sp. 1, head ♂; 2, head ♀. Scale: 100 μ m.

The CI of the females (Fig. 28) of the ZC and NO populations always overlap and present the greatest values; nevertheless, except for R₅, they cannot be distinguished from the CI of the other populations.

Lutzomyia (Pifanomyia) robusta n. sp.
(Figs. 1 - 25)

Lutzomyia serrana, partim; Alexander et al.¹, 1992: 128.

Lutzomyia serrana; Le Pont et al.⁵, 1994: 43, 46-48.

Male. Holotype. Length ca. 2.4 mm (paratypes: 2.5 ± 0.2 mm; n=10). Coloration clear brown, more accentuated on head and mesonotum.

Head (Fig. 1). Ratio length/width 1.10 (1.10 ± 0.04). Ratio between the lengths: clypeus/head 0.33 (0.33 ± 0.01); AIII/LE 1.32 (1.26 ± 0.06); eyes/head 0.57 (0.55 ± 0.03). Palpal formula: 1.4.2.3.5 (1.4.2.3.5; n=7 and 1.4(2.3).5; n=3). Palpomere III, as in Figure 6. Antenna: ascoid formula: AIII-AXIII 2. AXIV-AXV 1. AXVI 0; AIV e AV, as in Figures 3 and 4, respectively; rosette sensillae absent in AXI-AXIII and present in AXIV-AXVI (Fig. 5). Cibarium, as in Figure 7. Measurements, Table 1.

Thorax. Pleura with 3 (2 - 4) proepimeral (lower anepisternal) and 11 - 12 (6 - 10) upper anepisternal setae. Measurements, Table 2. Wing, as in Figure 17.

Abdomen. Tergites V-VII with tergal papillae. Sternite II (Fig. 18) with 8 (8-17) setae. Terminalia (Fig. 23): Style 108 µm (106 ± 4 µm) with subterminal seta, 2 strong spines: the apical and the subapical external upper spine and 1 internal spine, atrophied and situated near the base of the structure (this spine has a variable length and width). Coxite 178 µm (181 ± 9 µm) long, with basal sclerotized ridge and a tuff with 5 upturned curved setae, 4 of these are implanted in a single row and 1 situated out of line (Fig. 25). Paramere as in Figures 24 and 26. Aedeagus conical. Lateral lobe 227 µm (226 ± 13 µm) long, with round top. Cercus, as Figured. Genital pump 98 µm (102 ± 7.6 µm) long and ducts striated on the apical area, 388 µm (374 ± 32 µm) long, nearly 3.96 (3.66 ± 0.20) x length of pump (Fig. 21).

Female (n=10). Coloration, as in the male. Length, nearly 2.53 ± 0.11 mm.

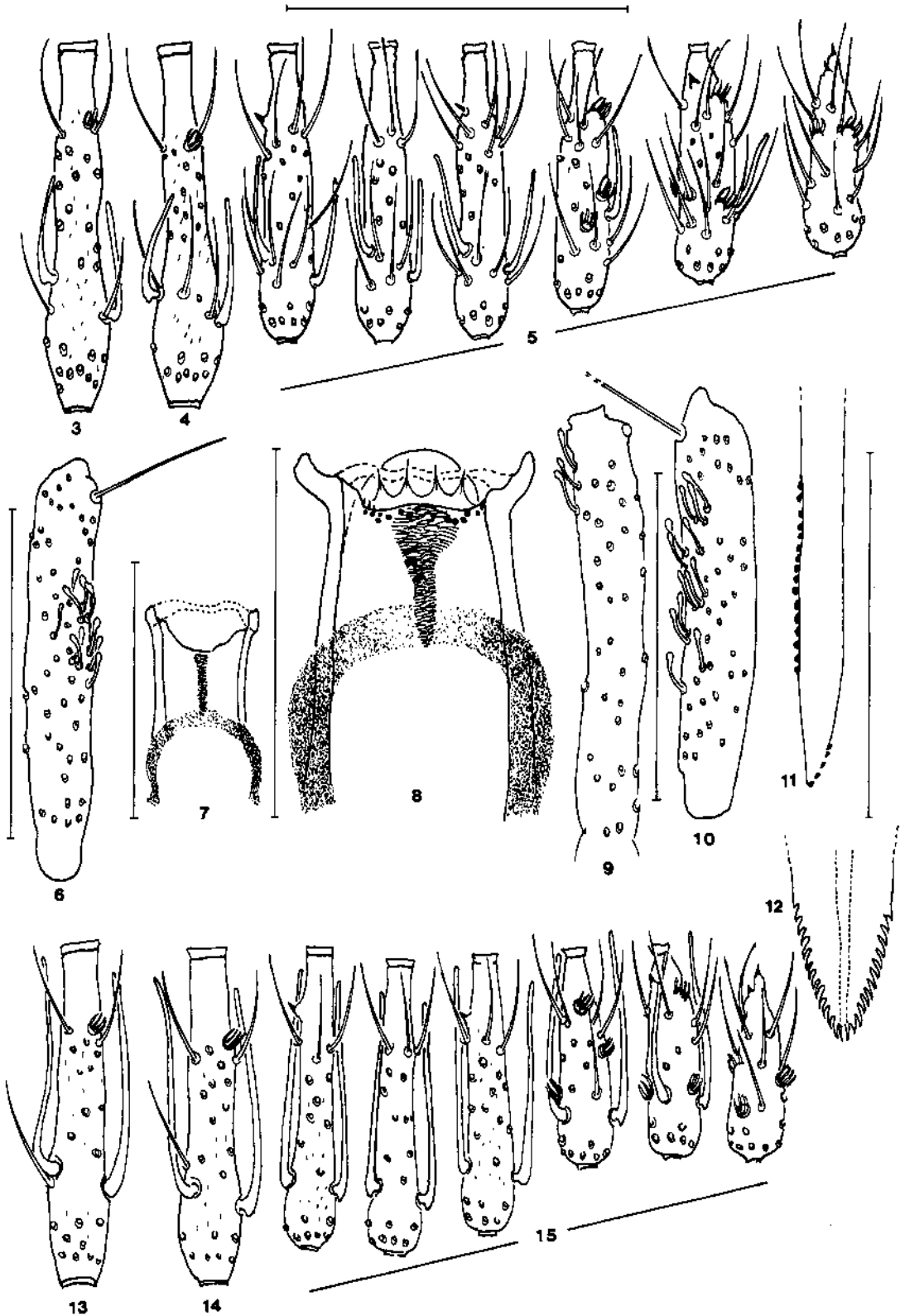
Head (Fig. 2). Ratio length/width 1.11 ± 0.02. Ratio between the lengths: clypeus/head 0.337 ± 0.006; eye/head 0.53 ± 0.02. AIII/LE 0.94 ± 0.03. Palpal formula 1.4.2.3.5. Palpomeres II and III, as in Figures 9 and 10. Antenna: AIV and AV, as in Figures 13 and 14; Ascoid formula AIII-AXV 2. AXVI 0; rosette sensillae absent in the AXI-AXIII

and present in the AXIV-XVI (Fig. 15). Cibarium (Fig. 8) with 4 equidistant horizontal teeth; 12-22 vertical teeth, distributed in a transversal irregular row and in lateral group; 3-4 little lateral teeth in each side; sclerotized arch complete. Pharynx, with apical area wrinkled and with atrophied teeth. Hipopharynx (Fig. 12) with 12-15 apicolateral teeth. Maxilla (Fig. 11) with 4-6 external teeth, in a single row and 16-22 internal teeth.

Thorax. 2-4 proepimeral (lower anepisternal) and 6-14 upper anepisternal setae. Wing as shown (Fig. 16). Measurements, Table 2.

Abdomen. Sternite II (Fig. 19) with 5-10 setae. Terminalia (Fig. 20): Tergite VIII with 1-6 setae on each side; cercus as figured. Espermathecae (Fig. 22) vesiculous, striated and with terminal annulus (9.8 ± 1.0 µm long and 18.7 ± 2.4 µm in width), without evident transition with the individual ducts, which are predominantly smooth, but striated joint to the spermatheca; this structure measures in length 103.8 ± 14.2 µm and in width 7.5 ± 0.4 µm, at the level of the joint with common duct, and 24.5 ± 2.0 µm at the level of the spermatheca; common duct smooth, 157.3 ± 33.9 µm long by 14.7 ± 1.4 µm at maximum width.

Types: Holotype ♂. Peru, *Region Nor-Oriental del Marañón*, San Ignacio, La Coipa (Barro Negro) (1500 m) (bedroom, with CDC - all night), 18/19.III.1992, (INSP). Paratypes 34 ♂, 35 ♀. Peru, *Región Nor-Oriental del Marañón*, province of San Ignacio, *district of La Coipa* (same data as the holotype) 2 ♂, 1 ♀ (INSP), 3 ♂; 1 ♀ (FSP), 1 ♂ (ORSTOM); *ibidem* (Estrella Divina) (1500 m) (bedroom, with CDC - all night), 14/15.III.1992, 1 ♂ 1 ♀ (FSP); *ibidem* (Las Cabazas) (1200 m) (bedroom, with CDC - all night), 17/18.III.1992, 2 ♂ (INSP); *ibidem* (Loma del Rey) (1500 m) (domicile, with cigarette smoke, aspirator and manual lantern), 16.III.1992, 2 ♀ (INSP), 1 ♂, 1 ♀ (FSP), 3 ♀ (ORSTOM), 2 ♀ (CPRR); *ibidem* (Pacaipite) (1460 m) (bedroom, with CDC all night), 16/17.III.1992, 1 ♀ (INSP) *ibidem* (peridomicile, with Shannon trap, 19:00 - 22:00 hours), 16.III.1992, 2 ♀ (FSP); *ibidem* (Vira-Vira) (1560 m) (bedroom, with CDC - all night), 15/16.III.1992, 2 ♀ (INSP), 3 ♂; 2 ♀ (FSP); *district of San José de Lourdes* (El Milagro) (1180 m) (rock crevice and tree root with cigarette smoke and manual aspirator), 14.II.1987, 1 ♂; 1 ♀ (INSP), 1 ♂, 1 ♀ (FSP), 2 ♂ (ORSTOM), 1 ♂ (CPRR); *ibidem* (1260 m) (bedroom, with CDC - all night), 19/20.III.1992, 2 ♀ (INSP), 1 ♀ (FSP), 4 ♀ (ORSTOM), 3 ♀ (CPRR); *ibidem*



Figures 3 -15 - *Lutzomyia robusta*, n. sp. 3, AIV ♂; 4, AV ♂; 5, AXI-AXVI ♂; 6, palpomere III ♂; 7, cibarium ♂; 8, cibarium ♀; 9, palpomere II ♀; 10, palpomere III ♀; 11, maxilla ♀; 12, hypopharynx ♀; 13, AIV ♀; 14 AV ♀; 15 AXI-AXVI ♀. Scale: 100 µm.

Table 1 - Measurements (µm), of the head characteristics of the holotype and paratypes of *Lutzomyia robusta*, n. sp.

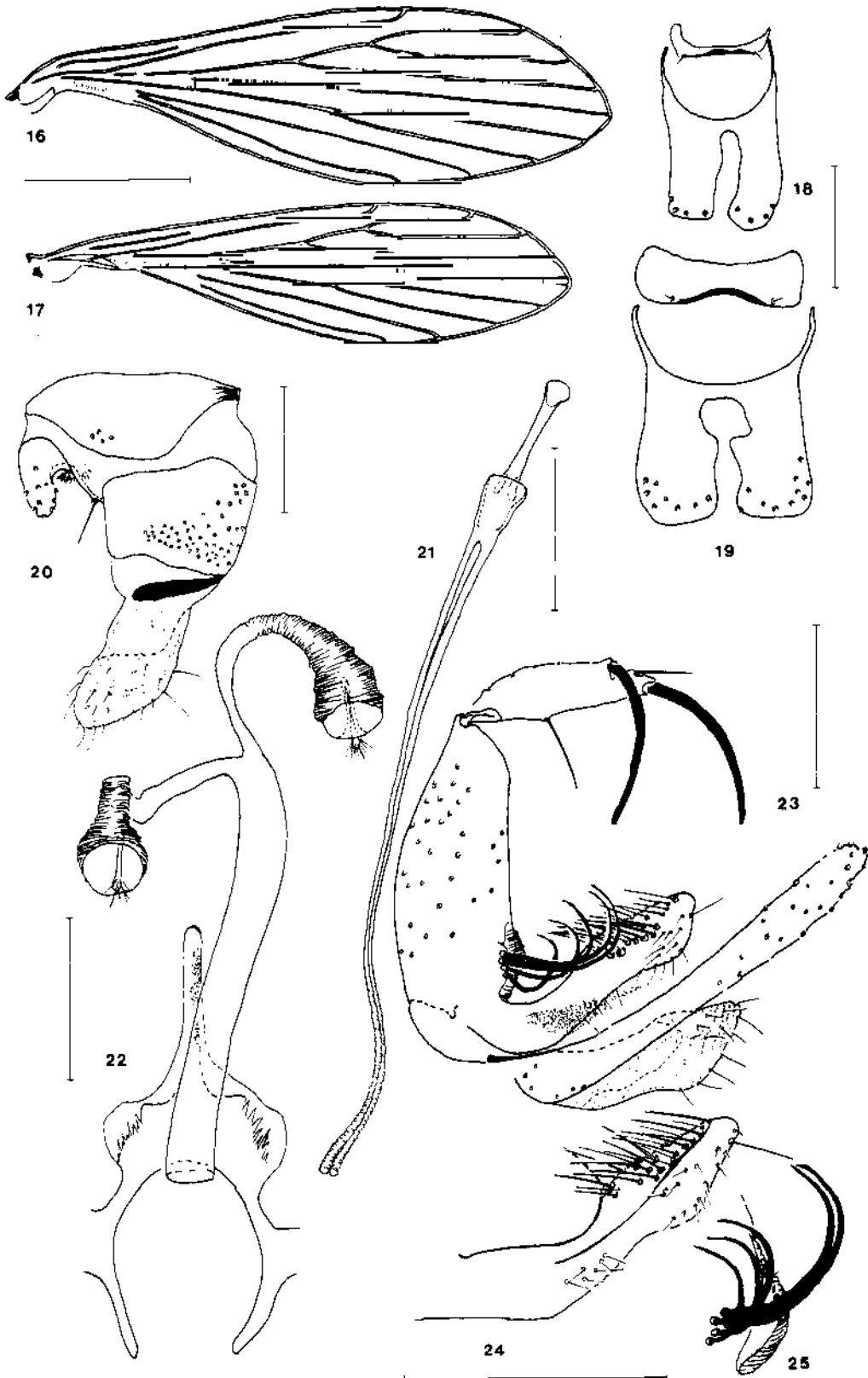
Characteristics	Holotype (male)	Paratypes			
		males (n = 10)		females (n = 10)	
		\bar{X}	SD	\bar{X}	SD
Head length	340	343	19	387	11
Head width	310	314	19	350	13
Interocular distance	110	110	3	120	3
Clypeus length	113	115	6	129	5
Eye length	195	188	14	206	10
Labrum-epipharynx (LE)	213	209	15	272	12
Antenna:					
AIII	280	264	24	254	7
AIV	120	118	9	108	5
AXV	75	70	4	67	3
AXVI	63	65	3	57	4
Palpomere					
I	33	31	4	41	2
II	128	128	10	148	8
III	130	134	10	154	6
IV	108	109	8	125	6
V	380	362	22	417	18

Table 2 - Measurements (µm), of the thoracic characteristics of the holotype and paratypes of *Lutzomyia robusta*, n. sp.

Characteristics	Holotype (male)	Paratypes			
		males (n = 10)		females (n = 10)	
		\bar{X}	SD	\bar{X}	SD
Length of the thorax	520	522	35	625	37
Wing:					
length	1,720	1,694	86	2,055	97
width	470	469	41	618	31
alpha (R ₂)	340	363	29	529	38
beta (R ₂₊₃)	210	203	28	254	30
gamma (R ₂₊₃₊₄)	280	270	23	299	30
delta	50	65	19	118	19
pi	110	107	20	117	24
Femur					
fore	660	664	36	738	19
mid	645	654	35	740	21
hind	705	703	39	782	23
Tibia					
fore	700	690	46	760	29
mid	862	859	51	946	39
hind	1,010	1,032	88	1,127	55
Tarsomere I					
fore	414	408	22	458	19
mid	500	493	32	560	21
hind	573	567	41	632	26
Ratio: tarsomere I / Tarsomeres II + III + IV + V					
fore	0.70	0.71	0.01	0.72	0.02
mid	0.78	0.77	0.02	0.80	0.02
hind	0.81	0.83	0.02	0.85	0.02

(El Salto) (1020 m) (peridomicile, human bait, 18:30 - 19:00 hours), 20.III.1992, 3 ♂ (ORSTOM); *ibidem* (La Loma) (1260 m) (bed-

room, CDC - all night), 20/21.III.1992, 3 ♂ (INSP), 1 ♂, 1 ♀ (FSP), 4 ♂ (ORSTOM), 3 ♂ (CPRR); province of Jaén, district of Jaén



Figures 16-25 - *Lutzomyia robusta*, n. sp. 16, wing ♀; 17, wing ♂; 18, I and II sternites ♂; 19 I e II sternites ♀; 20, terminalia ♀; 21, genital pump and ducts ♂; 22, espermathecae ♀; 23, terminalia ♂; 24, paramere ♂; 25, coxite setal tuff ♂. Scales: wings = 500 µm; other figures, 100 µm.

(Zonanga Alto) (1330 m) (peridomicile - human bait, 19:30 - 20:00 hours), 29.IX.1992, 3 ♀ (ORSTOM); *ibidem* (San Nicolas, La Chirimoya) (bedroom with cigarette smoke and manual aspirator), 29.IX.1992 1 ♂, 1 ♀ (INSP); *ibidem*, district of Santa Rosa (Puentecillos) (1680 m) (bed-

room, with CDC - 17:00 - 22:00 hours), 3.X.1992 1 ♂ (INSP). The specimens were all captured by A.G. Cáceres, R. Jimenéz, R. Diaz and E. León.

(CPRR) Centro de Pesquisa René Rachou, Fundação Oswaldo Cruz, Belo Horizonte, Minas Gerais, Brazil; (FSP) Faculdade de Saúde Pública,

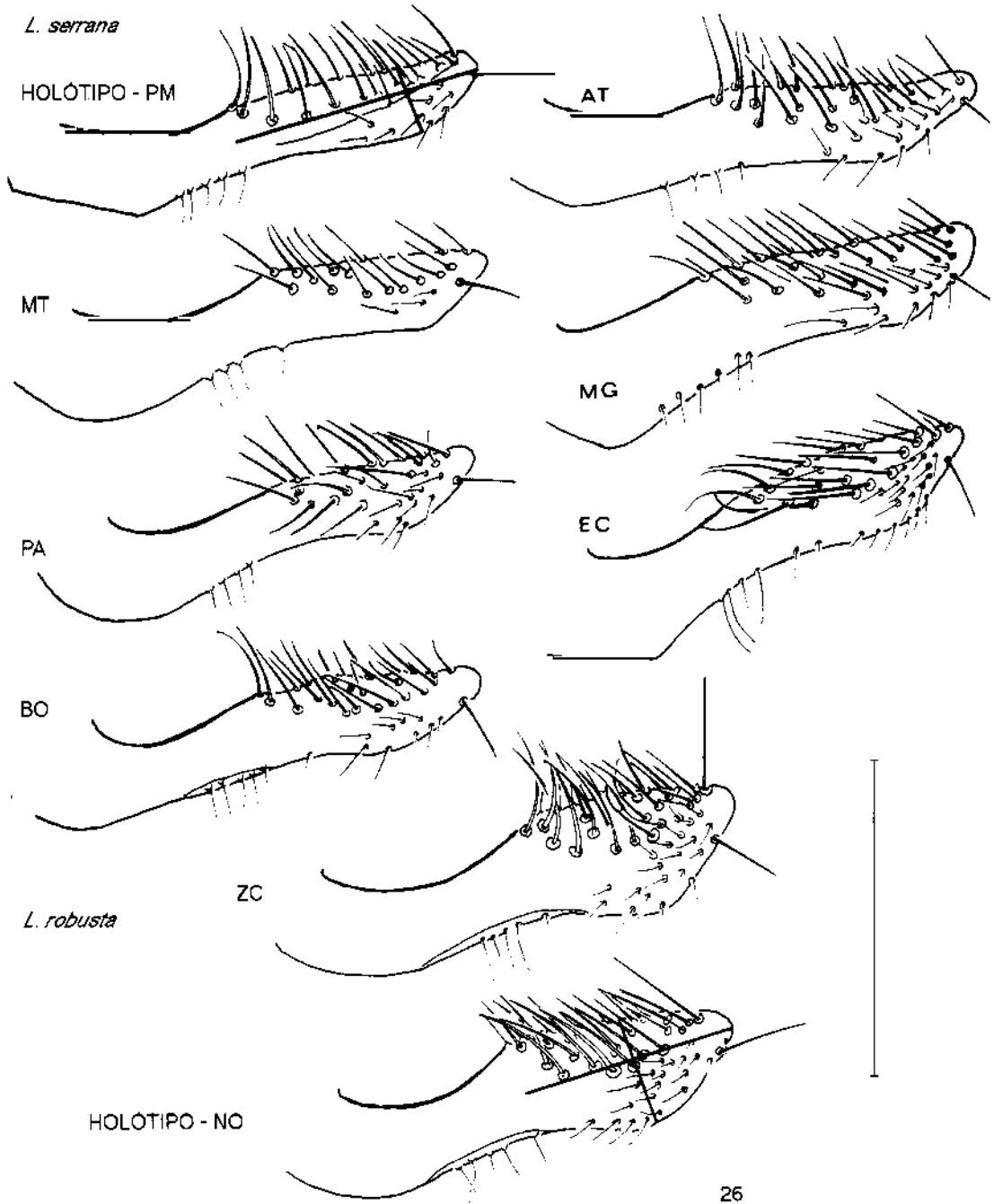


Figure 26 - Parameres of *Lutzomyia serrana* populations: AT, Atlantic, Brazil; BO, Bolivia-Amazonian; EC, Equador-Coast; MG, Minas Gerais, Brazil; MT, Mato Grosso, Brazil; PA, Peru-Amazonian; PM, Pará-Maranhão, Brazil and *Lutzomyia robusta* n. sp.: NO, Region Nor-Oriental del Marañón, Peru and ZC, Zamora-Chinchipe, Equador.

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Comments

Based on the eight characteristics of the males and seven of the females submitted to variance analysis, the interandean populations are similar. On the other hand, it is possible to distinguish them from all the populations of *L. serrana* studied by means four characteristics of the males: lengths of R₅ and hind tibia, width of the paramere and ratio between length and width of the apical area of the paramere (Fig. 26) and only one of the females: length of R₅.

It is possible distinguish the males of the two interandean populations of the *L. serrana* from the area-type (Amazonian) by means of the length of the AIII, labrum-epipharynx and by the wing width also.

The Mato Grosso (MT) population was included among those of the Amazonian area because the specimens were from the north of the State, which has the same ecological characteristics, as also the specimens from Pará and Maranhão (PM) which were studied together because they belong to areas characterised by similar vegetal cover.

The females of the *L. robusta* and *L. serrana* are not distinct, except as regards the R₅ length.

The population of *L. serrana* from Minas Gerais (MG) presents the confidence interval values nearest to those of *L. robusta* and at times, these are different from those of the Amazonian and Atlantic areas; hence it needs to be better evaluated, in view of possible genic flux interruption among the three *L. serrana* populations.

Based on this data, we denominate the new species of *L. robusta*, encountered in the Nor-Oriental del Marañón region of Peru and Zamora-Chinchipec, Equador, because of the larger size of the characteristics analysed, as compared to those of the *L. serrana*.

Since it was impossible to distinguished between the confidence intervals of the coastal population of the of Equador and those of the other *L. serrana* populations, as regards the various characteristics submitted to variance analysis, the synonymy of *P. guayasi* Rodriguez, as determined by Fairchild & Hertig² (1961), is corroborated.

Taxonomic Discussion. The *serrana* series of the subgenus *Pifanomyia*, according to Galati et

al.⁴ (1995) is characterized, in both sexes, by presenting long palpomere V, rosette sensilla on AV (except for series *evansi*) and the absence of the rosette sensillae on AXII and AXIII. Males with one ascoid on AXIV and AXV; style with sub-apical seta and three spines (the inferior external spine was lost) with internal spine situated on basal region of the structure; coxite with basal tuff constituted up to nine setae implanted directly on the surface, and lateral lobe with round top, without differentiated setae. The females present setae on tergite VIII; the spermathecae are striated and vesiculous, with terminal annulus. The species with these characteristics are: *L. odax* (Fairchild & Hertig, 1961), *L. oresbia* (Fairchild & Hertig, 1961), *L. orestes* (Fairchild & Trapido, 1950), *L. ottolinai* (Ortiz & Scorza, 1963), *L. robusta*, n. sp. e *L. serrana* (Damasceno & Arouck, 1949).

The distinguishing marks of the males of *serrana* series can be observed from the following key:

- 1. Coxite tuff with straight setae2
Coxite tuff with upturned curved setae3
- 2(1) Coxite tuff with 5 setae, the top of the longest of wich reaches paramere one..... *L. oresbia*
Coxite tuff with 3-4 setae, the top of the longest of which almost reaches the middle of the paramere*L. ottolinai*
- 3(1) Coxite tuff with 5 setae4
Coxite tuff with 6-7 setae.....*L. odax*
- 4(3) Paramere: ratio between length and width of apical part (setal area) smaller than or equivalent to 2.0 and with evident concavity on the dorsal margin, preceding the setal area.....*L. robusta*, n. sp.
Paramere: ratio between length and width of apical part (setal area) larger than or equivalent to 2.5; dorsal margin approximately straight*L. serrana*

The females of *L. robusta*, n. sp. in can be distinguished from the those of *L. oresbia* because they present spermathecae with large terminal annulus, its length is about 1/2 of those of the striated part. The separation of the other species was not possible, except by R₅ length, studied in the variance analysis, with regard to the *L. serrana*.

The association between the sexes of *L. robusta*, sp. n. was based on body coloration and by the simultaneous capture of males and females in the absence of other species of *Pifanomyia*, series *serrana*.

MALES

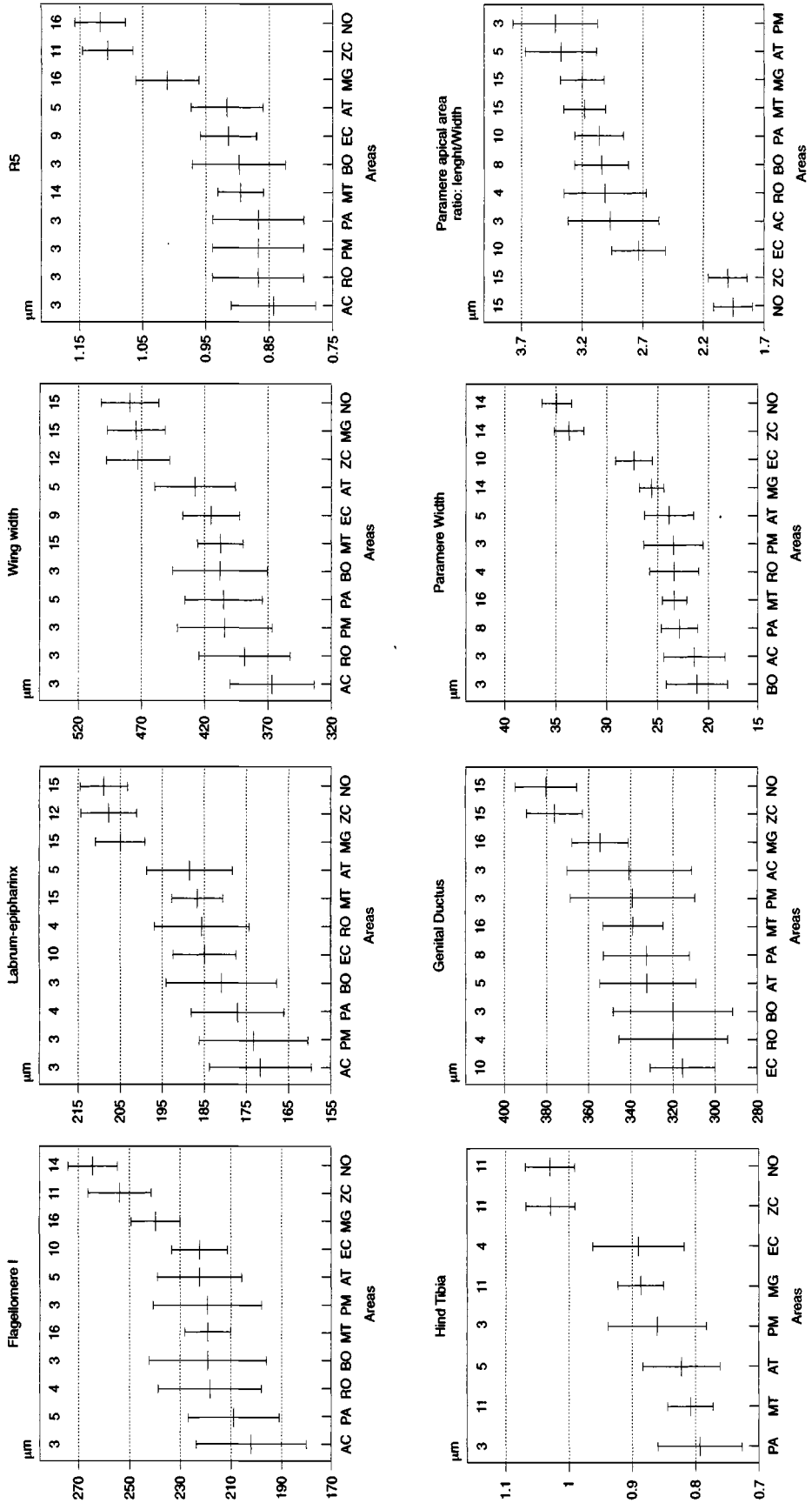


Figure 27 - Confidence Interval of eight male characteristics of the *Lutzomyia serrana* populations: AC, Acre, Brazil; AT, Atlantic, Brazil; BO, Bolivia-Amazonian; EC, Equador-Coast; MG, Minas Gerais, Brazil; MT Mato Grosso, Brazil; RO Rondônia, Brazil; PA, Peru-Amazonian; PM, Pará-Maranhão, Brazil and *Lutzomyia robusta*, n. sp.: NO, Region Nor-Oriental del Marañón, Peru e ZC, Zamora-Chinchipe, Equador. The numbers at the top of the graph are of the number of specimens observed.

FEMALES

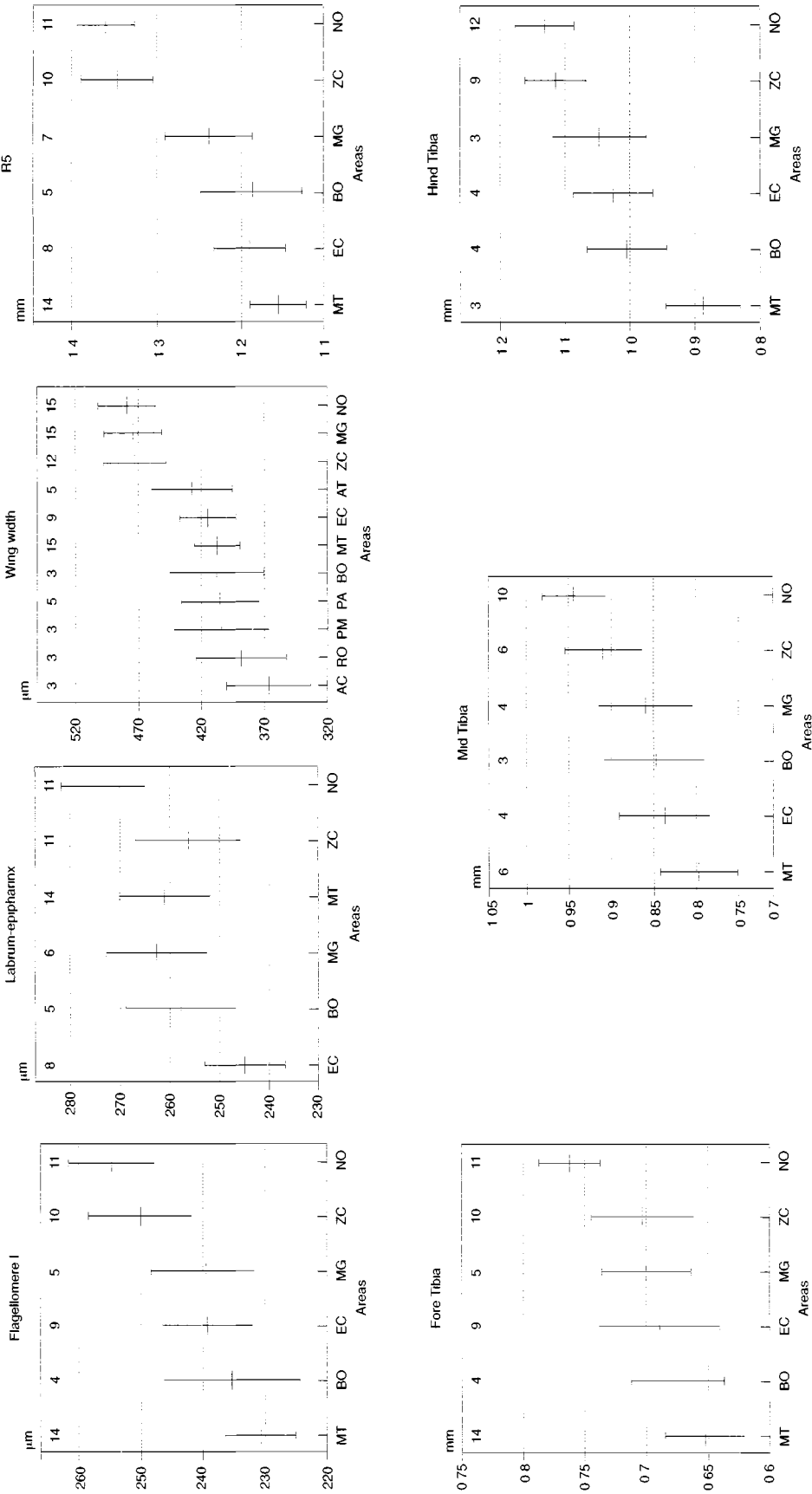


Figure 28 - Confidence Intervals of seven female characteristics of the *Lutzomyia serrana* populations: AT, Atlantic, Brazil; BO, Bolivia-Amazonian; EC, Equador-Coast; MG, Minas Gerais, Brazil; MT, Mato Grosso, Brazil; PA, Pará-Maranhão, Brazil and *Lutzomyia robusta*, n. sp.: NO, Region Nor-Oriental del Marañon, Peru e ZC, Zamora-Chinchiipe, Equador. The numbers at the top of the graph are of the number of specimens observed.

Conclusions

It was possible to distinguish *L. robusta*, n. sp. from the various *L. serrana* populations on the basis of four male characteristics among the eight submitted to variance analysis and only one of the female characteristics among the seven analysed.

The males of *L. robusta*, can be distinguished from those of the *L. serrana* by the appearance of the paramere, that in the former presents strong dorsal concavity preceding the setal area and is straighter in the latter.

The females of *L. robusta* are distinct those of the *L. serrana* as regard R_5 length only.

The *L. serrana* population from Minas Gerais presents male labrum-epipharynx and R_5 length and wing width confidence intervals distinct from those of the populations of the Amazonia and Atlantic areas. Thus, further more studies are necessary for its taxonomic characterization.

The *L. serrana* population from the coast of Equador is indistinguishable from the other population of the Amazonian areas. Thus, the synonymy of *P. guayasi* with *L. serrana* is corroborated.

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Examined Material

L. serrana: Brazil: Pará - Vizeu (Holotype ♂) (FSP); Irituia 1 ♂; Maranhão - Turiaçu 1 ♂; Acre - Cruzeiro do Sul 1 ♂, Feijó 2 ♂; Rondônia - Porto Velho 1 ♂, Guajará-Mirim 3 ♂; Mato Grosso - Alto Floresta 15 ♂ 11 ♀, Denise 1 ♂ 4 ♂, Mato Grosso 2 ♂; Minas Gerais - Caratinga 15 ♂ 9 ♀, Peçanha 1 ♂, Pirapora 1 ♂; Bahia Gandu 1 ♂, Ilhéus 1 ♂; Espírito Santo - Colatina 1 ♂; Rio de Janeiro - Nova Iguaçu 2 ♂ (CPRR); Peru: Madre de Dios 4 ♂, Loreto 4 ♂ (CPRR); Bolívia: 4 ♂ (ORSTOM), Alto Beni 1 ♂ (ORSTOM), Pandos 3 ♂ (CPRR); Equador: Paraiso Escondido 3 ♂ 1 ♀, La Tablada 2 ♂, Manabi 2 ♂ 3 ♀, Via Marta Quevedo, Km 98-100 3 ♂, 5 ♀ (FSP).

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Resumo

Descreve-se *Lutzomyia* (*Pfonomomyia*) *robusta*, sp.n., provável vetora de bartonelose e leishmaniose tegumentar, de ocorrência em vales interandinos no Peru e Equador e que apresenta estreita afinidade com *L. serrana* (Damasceno e Arouck). A separação de ambas foi possível, por meio de análise de variância de alguns caracteres do macho e apenas um da fêmea. Na análise de variância, foram estudadas populações de *L. serrana* da região amazônica do Brasil, Peru e Bolívia; costa do Equador; região atlântica e outras áreas do Brasil. Corrobora-se a sinonímia de *Phlebotomus guayasi* Rodriguez com *L. serrana*.

Psychodidae, classificação. *Ecologia de vetores*.