Description of *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. (Diptera: Psychodidae) a New Species of Phlebotomine Sand Fly from the State of Tocantins, Brazil

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During a study of the phlebotomines of the Brazilian state of Tocantins, a new species was discovered in Porto Nacional county, here described as Micropygomyia (Silvamyia) echinatopharynx *sp. nov. This is only the second species of the subgenus* Micropygomyia (Silvamyia) *to be described.*

Key words: *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov.- Phlebotominae - sand fly - Diptera - Psychodidae

The genus *Micropygomyia* Barretto, 1962 has as its main characteristics the palpal formula: 1.2.3.4.5 or 1.(2.4).3.5, or 1.2.4.3.5, the absence of the papilla on the third flagellomere of the setae on the anterior katepisternum margin and of the postalar bristle, and labium with united sutures. This genus is divided into four subgenera, one of them, *Silvamyia* Galati, 1995 being composed of only one species, *Micropygomyia* (*Silvamyia*) *acanthopharynx* (Martins Falcão & Silva, 1962), which is characterized by well developed teeth in the pharynx, an AIII longer than the head (male) or about 0.9 times its length (female) and a gonostyle with only one apical spine.

Thirty-five species have so far been reported in Tocantins, the new species having been captured in Porto Nacional county in orchards and around houses (Andrade Filho et al. 2001). We present the following description of the new species, named *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov., this name referring to the large number of spines in the pharynx.

The measurements are given in micrometers, with the mean and standard deviation values for the paratypes in parentheses. Several characters have been submitted to variance analysis (ANOVA) at the 5% significance level. For some other characters the Mann-Withney Test was used when it was impossible to apply ANOVA, that is to say, when the samples did not meet the necessary presupposition for the latter to be used; the values did not present normal distribution, constant variation or independence**.** The classification follows that proposed by Galati (1995) and the terminology of the characters is in accordance with Galati (2003).

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DESCRIPTION

Micropygomyia (*Silvamyia*) *echinatopharynx* sp. nv. (Figs 1-23).

Holotype female: total length 2650 (2676 ± 60.0, n = 12). Coloration pale chestnut, the pleurae being paler than the notum.

Head (Table I): length about 1.13 times width (1.05 ± 0.07; n = 20). Ratio clypeus/head 0.33:1 (0.34 ± 0.01; n = 20); eyes/head 0.53: 1 (0.51 ± 0.02; n = 20); labrum-epipharynx/head 0.54 (0.54 ± 0.02; n = 20); AIII very long, labrum-epipharynx/AIII 0.65 (0.64 ± 0.03; n = 16); AIII/head 0.87:1 (0.91: 1 ± 0.04; n = 16). Antennal formula AIII-AXV 2; AXVI 0. AIII, AIV and AV, with internal ascoid implanted at a more basal level than the external one. Ascoids reaching beyond the middle of the segment, without posterior prolongation. Final segments lost in the holotype, papillae being present in the paratypes on segments AXIV, AXV, and AXVI. Palpal formula 1.2.4.3.5. (1.2.4.3.5; n = 20), palpomere 3 being slightly longer than 4. Newstead's spines implanted in a group on the basal half of the third palpomere. Cibarial arch complete and pigment patch pale but easy to see. Four horizontal teeth, little developed, and in the form of a palisade. Pharynx with numerous spines and teeth throughout its apical region. Lacinia of the maxillae with the external teeth positioned in a longitudinal row.

Cervix: ventro-cervical sensillae present.

Thorax (Table III): coloration pale chestnut on the notum, katepisternum and coxae, other areas of the pleurae being pale. Proepimeral and upper anepisternal bristles present. Setae on the anterior katepisternum margin absent. Legs without special characteristics. Wings as in the figure.

Abdomen (Table V): 1470 long (1508 ± 53; n = 11). Spermathecae with approximately 10 annulations, poorly defined, 30 long (27 ± 2; n = 19) by 10 wide (11 ± 1; n = 19). Ducts visible only in the holotype, the individual ducts being about 4 x longer than the common duct, measuring 176 and 44 long respectively. Cerci simple, 158 long (151 ±

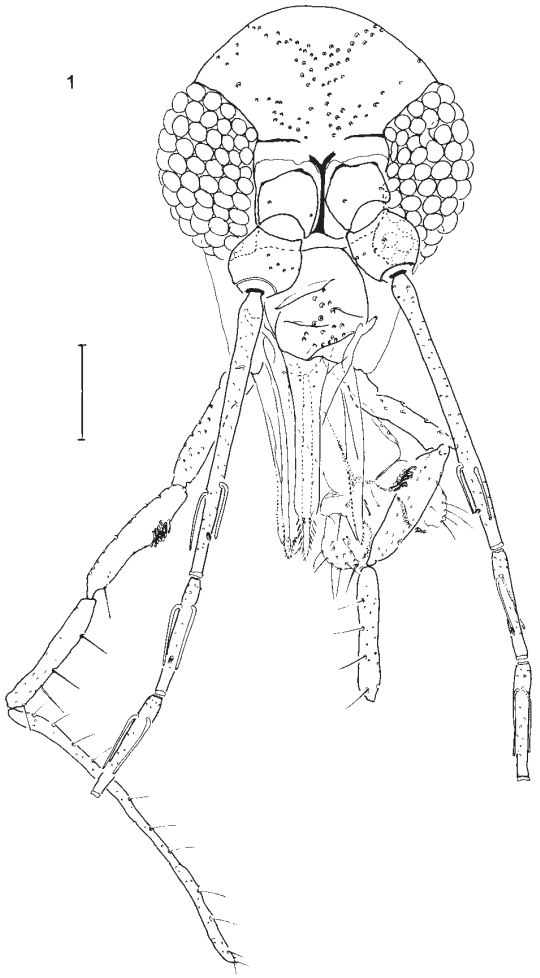


Fig. 1: *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. Holotype ♀- head. Bar = 100 µm.

10; n = 17).

Allotype male: total length 2415 (2444 ± 137.7; n = 8). Coloration as in the female.

Head (Table II): length 1.22 times width (1.18 ± 0.06; n = 10). Ratio clypeus/head 0.33:1 (0.35 ± 0.02; n = 10); eyes/head 0.49:1 (0.50 ± 0.02; n = 9); labrum-epipharynx/head 0.52 (0.51 ± 0.02; n = 9); AIII very long, ratio labrum-epipharynx/AIII 0.60 (0.55 ± 0.05; n = 5) AIII/head 0.87:1 (1.00 ± 0.06; n = 5). Antennal formula, distribution of the sensillae and position of the ascoids as in the female, distal prolongation of the ascoids being slightly shorter than in the females, reaching the middle of the flagellomere. Palpal formula 1.2.4.3.5 (1.2.4.3.5; n = 10). Distribution of Newstead's spines as in the females.

Cervix: ventro-cervical sensillae present.

Thorax (Table IV): coloration similar to that of the female. Proepimeral and upper anepisternal bristles present. Setae on the anterior katepisternum margin absent. Legs without special characters. Wings as in figure.

Abdomen (Table V): length 1360 (1424 ± 117; n = 9). Gonocoxite without tuft of setae, measuring 233 long (231 ± 11; n = 11) by 68 wide (66 ± 4; n = 11). Gonostyle 148 long (145 ± 7; n = 11), presenting four well-developed spines, i.e., one apical, one upper external implanted on the preapical region, one lower external implanted on the apical third and one internal implanted in the middle of the structure. Paramere simple, measuring 148 (148 ± 8; n = 11). Lateral lobe 203 long (212 ± 15; n = 11) by 28 wide (24 ± 2; n = 11). Aedeagus conical. Ejaculatory pump 118 long (117 ± 7; n = 10). Genital filament measuring 540 (508 ± 28; n = 11). Ratio genital filament/ ejaculatory pump 4.58 (4.37 ± 0.26; n = 10). Tips of genital filaments simple.

Collecting and storage of type material: holotype female, number 77361, captured on 28/08/2000, about 3 km from

TABLE I

Measurements (µm) of the structures of the head and its appendages in females of *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. and *Micropygomyia* (*Silvamyia*) *acanthopharynx*

		M. echinatopharynx			*M. acanthopharynx*				
		Paratypes female			Paratypes female			Anova	
Structure	Holotype	X	SD	N	X	SD	N	F_{tab}	F_{obs}
Head length	360	358	12	20	381	19	6	0,05	0,0047 *a*
Head width	320	342	24	20	321	27	4	4,28	2,31
Interocular	128	130	5	20	122	14	4	4,28	5,37 *a*
Clypeus length	120	122	6	21	139	10	4	4,26	27,93 *a*
Eye length	190	183	9	20	190	8	4	4,28	1,81
Eye width	93	106	8	20	109	10	4	4,28	0,66
LE	193	195	6	21	216	19	4	4,26	21,09 *a*
AIII	295	306	16	17	320	23	6	4,32	2,69
AIV	125	128	6	16	133	10	6	4,32	2,20
AV	120	129	6	17	133	12	6	4,30	1,13
AXV		64	3	15	65	4	5	0,05	0,7270
AXVI		64	3	15	66	6	5	0,05	0,6005
P1	35	35	2	21	38	3	5	0,05	0,0805
P2	100	99	6	21	95	5	5	4,24	2,84
P3	150	145	9	20	149	11	6	0,05	0,9767
P4	140	136	7	20	147	12	5	4,26	7,08 *a*
P5	353	339	21	19	346	36	5	4,28	0,26

a: statistically significant; head length, AXV, AXVI; P1, P3: Mann-Whitney Test

Fig. 2: *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. Allotype ♂- head. Bar = 100 µm.

the Tocantins river on the Fazenda Serragem, in Porto Nacional county, state of Tocantins; allotype male number 73950, 23/07/1998, in a chicken house on the Fazenda Mata Grande, Porto Nacional, Tocantins; six female paratypes, numbers 73909-73914 and four male paratypes, numbers 73905-73908, 23/07/1998, between piles of stones, close to a corral on the Fazenda Mata Grande, Porto Nacional, Tocantins; twelve female paratypes, numbers 73951-73962 and five male paratypes, numbers 73945-73949, 23/07/1998, in a chicken house on the Fazenda Mata Grande, Porto Nacional, Tocantins; two female paratypes, numbers 74092 and 74093, 27/07/1998, in an orchard on the Fazenda Mutum, Porto Nacional, Tocantins; one male paratype, number 77360, 28/08/2000, about 3 km from Tocantins River on the Fazenda Serragem, Porto Nacional, Tocantins; one female paratype, number 77497 and one male paratype number 77496, 28/08/2000, in a chicken house on the Fazenda Serragem, Porto Nacional, Tocantins. The capture on 17/07/1998, in the Fazenda Mutum was made with Falcão light trap and the others were made with CDC light traps.

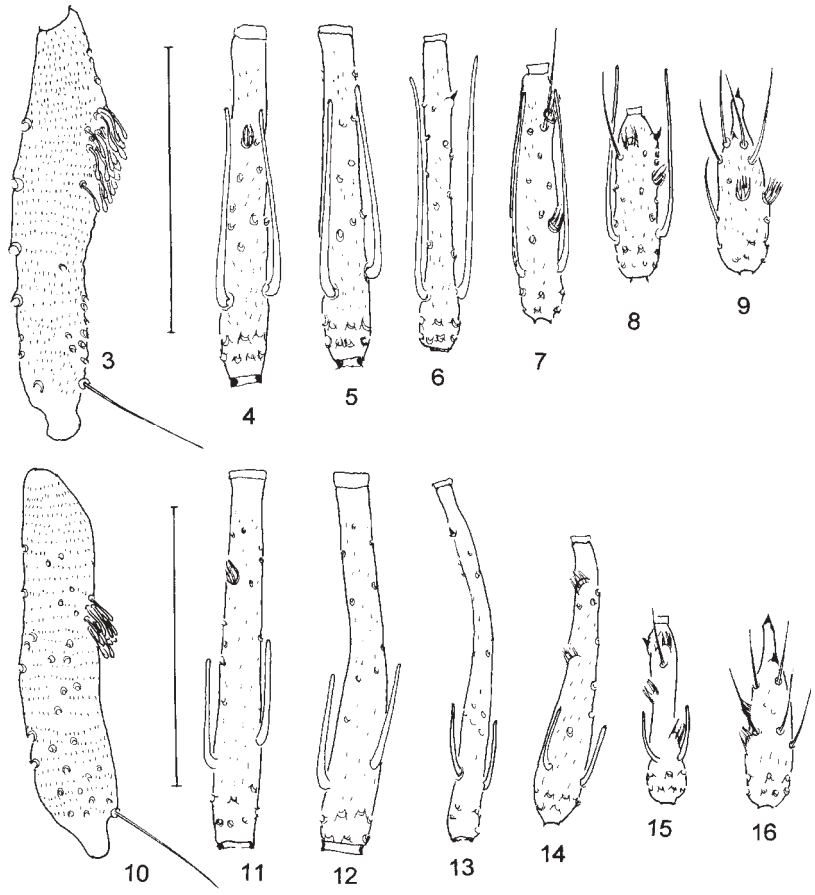
Holotype and allotype have been deposited in the phlebotomine collection of the Centro de Pesquisas René Rachou-Fiocruz, Belo Horizonte, Minas Gerais, together with 18 female and eight male paratypes. One pair of paratypes has been deposited in the collection of the Instituto Oswaldo Cruz, Rio de Janeiro, RJ. One pair of paratypes has been deposited in the collection of the Instituto Nacional de Pesquisa da Amazônia, Manaus, Amazonas. One pair of paratypes has been deposited in the collection of the Faculdade de Saúde Pública da Universidade de São Paulo, São Paulo, SP.

TABLE II

Measurements (µm) of the structures of the head and its appendages in males of *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. and *Micropygomyia* (*Silvamyia*) *acanthopharynx*

		M. echinatopharynx			*M. acanthopharynx*			Anova	
		Paratypes female			Paratypes female				
Structure	Allotype	X	SD	N	X	SD	N	F_{tab}	F_{obs}
Head length	345	339	15	10	383	16	2	4,84	15,80 [a]
Head width	283	284	18	9	259		1	5,12	1,96
Interocular	120	114	7	9	124		1	5,12	1,60
Clypeus length	115	118	9	10	149	6	4	4,67	43,38 [a]
Eye length	170	168	12	9	152		1	5,12	1,79
Eye width	83	88	6	10	83		1	4,96	0,49
LE	180	183	12	10	205	12	4	4,67	11,38 [a]
AIII	300	344	30	6	344	52	5	4,96	3,06
AIV	138	148	8	6	161	6	5	4,96	11,91 [a]
AV	140	149	7	6	161	7	5	4,96	10,36 [a]
AXV	58	64	4	3	66	8	5	5,59	0,82
AXVI	63	59	5	3	65	7	5	5,59	1,24
P1	33	34	3	11	36	3	5	0,05	0,23
P2	98	98	6	11	101	9	5	4,54	0,57
P3	138	145	8	11	150	11	5	4,54	2,07
P4	120	129	7	10	146	9	5	4,60	17,23 [a]
P5	263	275	18	10	298		1	4,96	1,76

a: statistically significant; P1: Mann-Whitney Test



Figs 3-16: *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. Fig. 3: holotype ♀ - palpomere III. Fig. 4: holotype ♀ - AIV. Fig. 5: holotype ♀ - AV. Fig. 6: paratype ♀ - AXIII. Fig. 7: paratype ♀ - AXIV. Fig. 8: paratype ♀ - AXV. Fig. 9: paratype ♀ - AXVI. Fig. 10: allotype ♂ - palpomere III. Fig. 11: allotype ♂ - AIV. Fig. 12: allotype ♂ - AV. Fig. 13: paratype ♂ - AXIII. Fig. 14: paratype ♂ - AXIV. Fig. 15: paratype ♂ - AXV. Fig 16: paratype ♂ - AXVI. Bars = 100 µm

TABLE III

Measurements (µm) of the structures of the thorax in females of *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. and *Micropygomyia* (*Silvamyia*) *acanthopharynx*

		M. echinatopharynx			*M. acanthopharynx*				
		Paratypes female			Paratypes female			Anova	
Structure	Holotype	X	SD	N	X	SD	N	F_{tab}	F_{obs}
Wing width	560	550	26	21	590	42	6	4,22	8,17 *a*
Alpha	400	411	40	21	442	46	5	0,05	0,0981
Beta	310	314	27	21	336	30	5	4,24	2,74
Gamma	230	233	20	21	239	35	5	4,24	0,29
Delta	90	87	21	21	129	34	5	4,24	12,76 *a*
R5	1240	1244	48	21	1325	81	5	4,24	9,20 *a*
Anterior femur	770	750	35	12	789	69	3	4,67	2,06
Median femur		721	25	14	755	49	4	4,49	3,67
Posterior femur		793	29	14	834	59	3	4,54	3,44
Anterior tibia	1000	1040	46	12	1033	86	3	4,60	0,01
Mean tibiae		1169	56	14	1175	85	4	4,49	0,03
Posterior tibia		1376	73	14	1390	104	3	4,54	0,08
First anterior tarsomere	630	648	28	11	654	49	3	4,67	0,12
First median tarsomere		671	30	14	682	59	4	4,49	0,27
First posterior tarsomere		742	41	14	774	86	3	4,54	1,06
Anterior tarsomeres 2 +3+4+5	730	747	29	11	721	49	3	4,67	1,36
Median tarsomeres 2+3+4+5		740	36	14	704	45	4	4,49	2,72
Posterior tarsomeres 2+3+4+5		776	33	14	747	46	3	4,54	1,69

a: statistically significant; alpha: Mann-Whitney Test

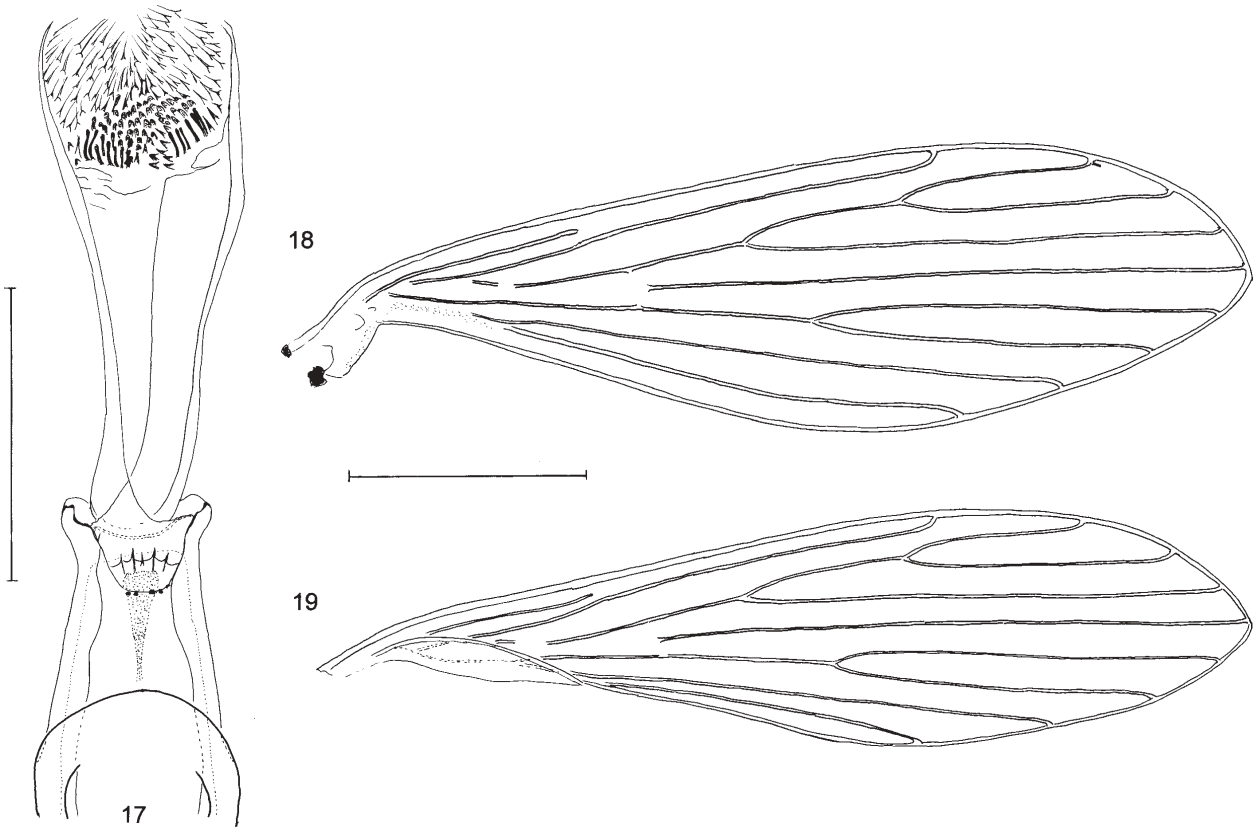
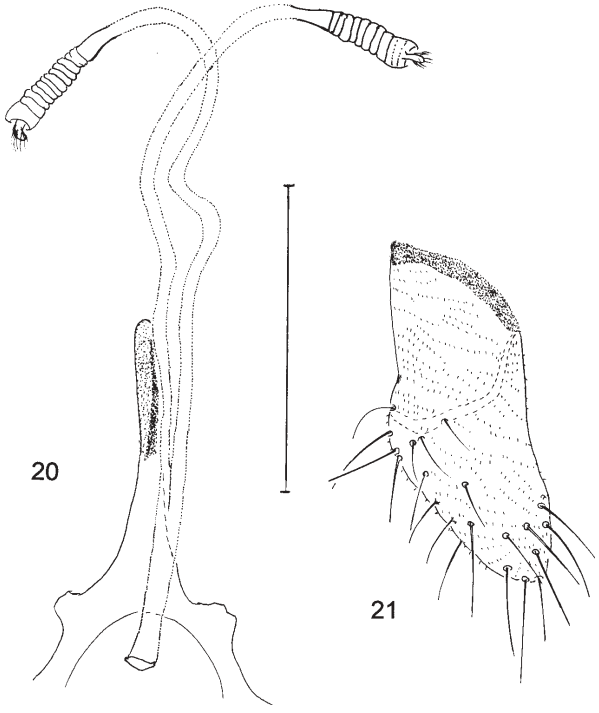


Fig. 17: *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. Holotype ♀ - cibarium and pharynx. Bar = 100 µm. Figs 18-19: *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. Fig. 18: holotype ♀ - wing. Fig.19: allotype ♂ - wing. Bar = 500 µm

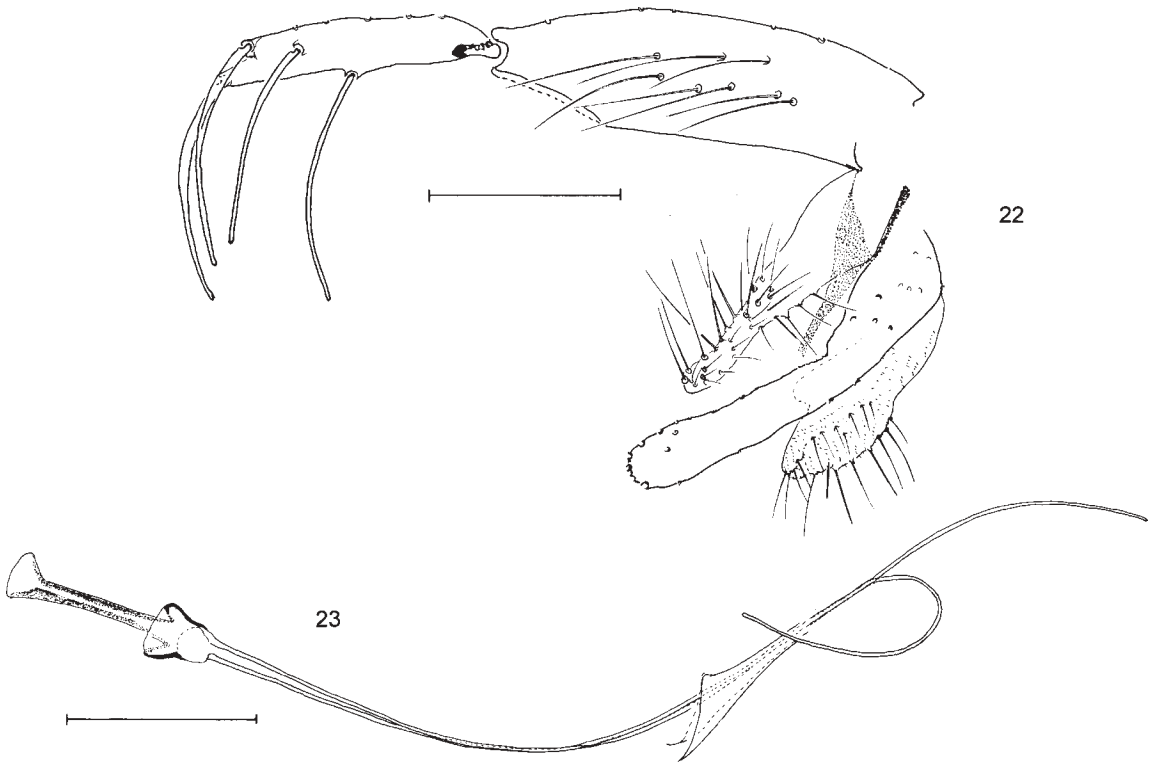


Figs 20-21: *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. Fig. 20: holotype ♀ - genital fork and spermathecae. Fig. 21: holotype ♀ - cercus. Bar = 100 µm

REMARKS

The only species belonging at present to the subgenus *Silvamyia* is *M. acanthopharynx*. *M. echinatopharynx* n. sp. and *M. acanthopharynx* may be distinguished by several female and male characteristics (Tables I-V), among which the length of the clypeus, labrum-epipharynx and width of the wing are noteworthy, all been greater in the latter species. In the male terminalia, only the genital filaments of the two species present no difference at the 5% level, the ratio between the length of this structure and that of the ejaculatory pump being always greater than 4.12 in *M. echinatopharynx* and less than 3.97 in *M. acanthopharynx*. The position of the spines on the gonostyle permits a clear distinction to be made between the two species: in *M. acanthopharynx* the lower external spine and the internal one are located at the same level, while in new species they are at different levels, the lower external spine being in the apical third and the internal one in the middle of the gonostyle. The female of the new species can be distinguished clearly from that of *M. acanthopharynx* by the cibarial teeth, less developed in the new species.

The two species were captured in the same ecotopes, on the savanna land of the central region of Brazil (Martins et al. 1962, Andrade Filho et al. 2001), which shows that *M. echinatopharynx* is really a different species from *M. acanthopharynx* and that they are not intraspecific varieties.



Figs 22-23: *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. Fig. 22: allotype ♂ - terminalia. Fig. 23: allotype ♂ - genital pump and filaments. Bars = 100 µm

TABLE IV

Measurements (µm) of the structures of the thorax in males of *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. and *Micropygomyia* (*Silvamyia*) *acanthopharynx*

		M. echinatopharynx			*M. acanthopharynx*				
		Paratypes female			Paratypes female			Anova	
Structure	Aloparatype	X	SD	N	X	SD	N	F_{tab}	F_{obs}
Wing width		444	28	7	516	56	5	4,96	8,71 [a]
Alpha		348	38	3	399	63	5	5,59	2,06
Beta		303	5	4	320	38	5	5,59	0,82
Gamma		210	30	3	241	33	5	5,99	1,82
Delta		38	17	4	68	57	5	5,99	7,18 [a]
R5		1100	110	4	1251	117	5	5,59	3,90
Anterior femur	710	729	26	7	706	54	2	5,32	0,72
Median femur	690	678	30	6	781	64	3	5,32	14,44 [a]
Posterior femur	760	760	50	4	823	87	4	5,59	2,04
Anterior tibia	1020	1071	62	7	1048	127	2	5,32	0,58
Mean tibiae	1160	1184	82	5	1225	115	3	5,59	3,87
Posterior tibia	700	728	54	4	1418	154	4	5,59	4,00
First anterior tarsomere	650	658	29	6	660	56	2	5,59	0,01
First median tarsomere	660	656	43	5	699	49	3	5,59	2,02
First posterior tarsomere	700	728	54	4	769	62	4	5,59	1,65
Anterior tarsomeres 2 +3+4+5	720	728	33	6	688	64	2	5,59	1,77
Median tarsomeres 2+3+4+5	720	718	29	5	706	58	3	5,59	0,21
Posterior tarsomeres 2+3+4+5		745	38	4	755	60	3	6,61	0,07

a: statistically significant

TABLE V

Measurements (µm) of the structures of the abdomen in males and females of *Micropygomyia* (*Silvamyia*) *echinatopharynx* sp. nov. and *Micropygomyia* (*Silvamyia*) *acanthopharynx*

		M. echinatopharynx			*M. acanthopharynx*				
		Paratypes female			Paratypes female			Anova	
Structure	Holotype	X	SD	N	X	SD	N	F_{tab}	F_{obs}
Spermatheca length	30	27	2	19					
Spermatheca width	10	11	1	19					
Cerca length	158	151	10	17	138	7	4	4,32	8,26 *a*
		Paratype male			Paratype male				
Structure	Aloparatype	X	SD	N	X	SD	N	F_{tab}	F_{obs}
Gonocoxite length	233	231	11	11	307	11	4	4,60	166,77 *a*
Gonocoxite width	68	66	4	11	84	8	4	4,60	34,11 *a*
Gonostyle length	148	145	7	11	185	11	5	4,54	82,94 *a*
Lateral lobe length	203	212	15	11	261	21	5	4,54	32,87 *a*
Lateral lobe width	28	24	2	11	28	3	5	0,05	0,0398 *a*
Ejaculatory pump	118	117	7	10	134	4	4	4,67	22,55 *a*
Genital filament	540	508	28	10	508	26	4	4,60	0,04
Ratio genital filament/ ejaculatory pump	4,58	4,44	0,24	11	3,80	0,16	4	4,67	24,59 *a*
Internal spine - external spine inferior	28	26	4	11	2	5	11	4,35	183,05 *a*

a: statistically significant; Lateral lobe width: Mann-Whitney Test

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