ZOOLOGIA 28 (5): 658–662, October, 2011
doi: 10.1590/S1984-46702011000500014

Description of *Microvelia urucara* sp. nov. and new distributional data on veliids (Insecta: Heteroptera: Veliidae) from the Amazon River floodplain, Brazil

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ABSTRACT. Based on material collected on streams and lakes from the Amazon River floodplain, Brazil, *Microvelia urucara* **sp. nov.** is described, illustrated and compared with similar species. The new species, like many other Neotropical *Microvelia* Westwood, 1834, does not present striking modifications on the body or appendages, but can be separated from its congeners by features of the male genitalia. Distributional data is presented for other veliids collected along the Amazon River, and *Paravelia capixaba* Moreira, Nessimian & Rúdio, 2010 and *Microvelia summersi* Drake & Harris, 1928 are recorded for the first time from the Brazilian Amazon. *Rhagovelia jubata* Bacon, 1948 is newly recorded from the state of Amazonas, and *Microvelia mimula* White, 1879, *M. pulchella* Westwood, 1834 and *M. venustatis* Drake & Harris, 1933 are recorded for the first time from the state of Pará.

KEY WORDS. Aquatic insects; Hemiptera; morphology; Neotropics; taxonomy.

In the Brazilian Amazon, floodplains of white rivers (locally called várzeas) cover an area of more than 100,000 km^2, including lakes, meanders, small tributaries, floating meadows and seasonally flooded forests. These environments are amongst the most important Amazonian ecosystems in terms of biodiversity. Due to the high nutrient concentration in white waters, this ecosystem is the most productive in the Amazon Basin (Goulding *et al*. 2003, Albernaz 2008).

Gerromorpha is a diverse group of semi-aquatic bugs, nowadays divided into eight families, five of which occur in Brazil: Gerridae, Hebridae, Hydrometridae, Mesoveliidae and Veliidae (Schuh & Slater 1995, Nieser & Melo 1997). Most of the extant representatives of Gerromorpha have the ability to walk or skate above the water film, and representatives of the families Gerridae and Veliidae spend most of their active life on the water surface (Andersen 1982, Schuh & Slater 1995).

The Gerromorpha from the Amazon River floodplain have recently been the target of taxonomic and faunistic studies, including the families Mesoveliidae, Hydrometridae and Gerridae (Moreira *et al*. 2008, 2009, 2011). The present contribution is the last study of this series, and includes the description of a new species of *Microvelia* Westwood, 1834 and distributional data for veliids collected along the Amazon River floodplain in Brazilian territory.

MATERIAL AND METHODS

This study includes 26 localities in the floodplain of the Amazon River in the Brazilian territory, between the municipalities of Tabatinga, state of Amazonas, and Afuá, state of Pará (Moreira *et al*. 2011: fig. 1; this work: Tab. I). The examined material was collected on floating plants of *Eichhornia* Kunth (Commelinales: Pontederiaceae) or on U.V. light traps positioned near the water, and additional qualitative collections were conducted in streams (igarapés) and lakes near the sampling sites. Jorge L. Nessimian and Neusa Hamada collected samples from stations 1-13, and Nelson Ferreira-Jr. and Paulo de Marco-Jr. collected samples from stations 14-26. Even with the additional collections, no Veliidae specimens have been found in some of the localities.

Specimens have been fixed, preserved and examined in 80% ethanol, and belong to the collections of the Instituto Nacional de Pesquisas da Amazônia (INPA) and Coleção Entomológica Professor José Alfredo Pinheiro Dutra, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro (DZRJ). Identification of specimens was based mainly on Drake & Harris (1928), Drake & Hussey (1951), Nieser & Alkins-Koo (1991), Polhemus & Spangler (1995), Polhemus (1997), Nieser & Melo (1997), and Moreira *et al.* (2010).

Table I. Location, date and coordinates of the collecting stations along the Amazon River floodplain, Brazil.

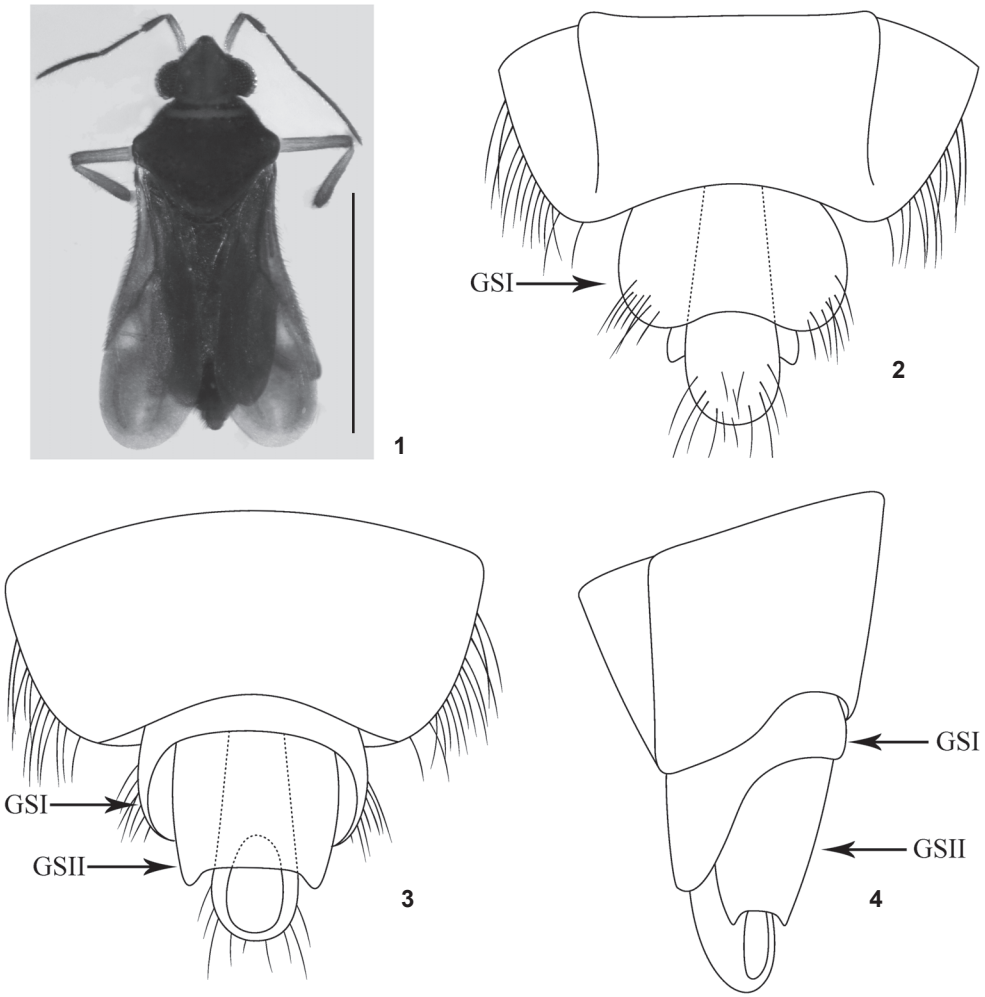
Station	State	Municipality	Locality	Sampling site	Date	Latitude	Longitude
1	Amazonas	Tabatinga	Palmares	Lago Ressaca do Assacaia	02.IX.2003	-3.98837	-69.37434
1A	Amazonas	Tabatinga	Palmares	Lago Ressaca do Felix	03.IX.2003	-4.01238	-69.42596
2	Amazonas	São Paulo de Olivença	Bom Sucesso	Lago Ventura	04.IX.2003	-3.46474	-69.00533
3	Amazonas	Santo Antônio do Içá	Vila Presidente Getúlio Vargas	Lago do Espanhol	04.IX.2003	-3.12291	-67.97323
3A	Amazonas	Santo Antônio do Içá	Vila Presidente Getúlio Vargas	Lago Canini	04.IX.2003	-3.16629	-67.97124
4	Amazonas	Jutaí	São Raimundo	Lago do Bosco	06.IX.2003	-2.68867	-66.87529
5	Amazonas	Fonte Boa	Fonte Boa	Lago Ressaca Grande	08.IX.2003	-2.47399	-66.15474
6	Amazonas	Tefé	São Francisco da Boca da Capivara	Lago Botão	09.IX.2003	-3.26539	-64.62745
7	Amazonas	Tefé	São João do Catuá	Lago da Piranha	11.IX.2003	-3.62524	-64.18968
7A	Amazonas	Tefé	São João do Catuá	Lago Campina	11.IX.2003	-3.69927	-64.14233
8	Amazonas	Coari	Monte das Oliveiras	Lago do Quintino	12.IX.2003	-3.89341	-63.35261
8A	Amazonas	Coari	São Francisco do Laranjal	Lago Apaurá	12.IX.2003	-3.89303	-63.43530
9	Amazonas	Coari	Vila de Trocaris	Lago Baracari	13.IX.2003	-3.91631	-62.86139
10	Amazonas	Codajás	Urucuruzinho	Lago Urucuri	15.IX.2003	-3.91960	-62.04738
10A	Amazonas	Codajás	Urucuruzinho	Lago Cuxuará	15.IX.2003	-3.97121	-61.96065
11	Amazonas	Anamã	Boa Esperança	Lago Bom Jesus	16.IX.2003	-3.65812	-61.49109
11A	Amazonas	Anamã	Boa Esperança	unnamed lake	16.IX.2003	-3.64922	-61.47149
12	Amazonas	Manacapuru	Cristo Ressucitado	Lago Camoa	17.IX.2003	-3.57995	-60.82906
13	Amazonas	Iranduba	Nossa Senhora da Conceição	Lago Jacitara	18.IX.2003	-3.27798	-60.27626
14	Amazonas	Itacoatiara	Nossa Senhora do Perpétuo Socorro	Lago Traíra	21.IX.2003	-3.15998	-59.32716
15	Amazonas	Itacoatiara	Ilha da Trindade	unnamed lake	22.IX.2003	-3.32478	-58.74241
16	Amazonas	Urucará	Lírio do Vale	Lago do Albano	24.IX.2003	-2.41418	-57.49993
17	Amazonas	Parintins	Menino Deus	Lago Comprido	25.IX.2003	-2.49865	-56.49080
18	Pará	Juruti	Recreio	Lago Recreio	26.IX.2003	-2.06607	-55.95935
19	Pará	Óbidos	Januária	Lago Ipapucu	27.IX.2003	-2.10169	-55.28678
20	Pará	Santarém	Santana do Ituqui	Lago Maicá	30.IX.2003	-2.51221	-54.32885
21	Pará	Prainha	Capiranga	Lago Mureru	02.X.2003	-2.38959	-54.08131
22	Pará	Prainha	Retiro JK	Lago do Retiro JK	04.X.2003	-1.85557	-53.71524
23	Pará	Almeirim	Paranaquara	unnamed lake	05.X.2003	-1.74198	-53.17167
24	Pará	Almeirim	Nova Aramanduba	unnamed lake	07.X.2003	-1.45330	-52.49677
25	Pará	Almeirim	Paraná do Tauaçui	lake/river	08.X.2003	-1.17777	-51.79407
26	Pará	Afuá	Rio Três Irmãos	lake/river	08.X.2003	-0.42403	-51.40745

Abbreviations used for measurements are as follows: body length (BL), head length (HL), head width through eyes (HW), length of antennomeres I-IV (ANT I, ANT II, ANT III, ANT IV), minimum interocular distance (INT), maximum eye width (EYE), pronotum length on midline (PL), pronotum width (PW), length of fore leg segments (FORELEG), length of middle leg segments (MIDLEG), length of hind leg segments (HINDLEG), femoral length (FEM), tibial length (TIB), length of tarsomeres I-II (TAR I, TAR II).

Microvelia urucara **sp. nov.**

Figs 1-4

Macropterous male. BL 1.61-1.64; HL 0.31-0.35; HW 0.41-0.44; ANT I 0.19-0.21, ANT II 0.11-0.14, ANT III 0.19-0.23, ANT IV 0.40-0.44; INT 0.23-0.24; EYE 0.11-0.13; PL 0.50-0.51; PW 0.58-0.63; FORELEG: FEM 0.40-0.46, TIB 0.28-0.31, TAR I 0.15-0.18; MIDLEG: FEM 0.41-0.44, TIB 0.34-0.38, TAR I 0.09-0.10, TAR II 0.11-0.13; HINDLEG: FEM 0.46-0.48, TIB 0.53-0.55, TAR I 0.10-0.11, TAR II 0.13-0.14.



Figures 1-4. *Microvelia urucara* **sp. nov.** (1) macropterous male, dorsal view; and apex of abdomen and genital segments, male, in: (2) dorsal view; (3) ventral view; (4) lateral view. (GSI) Genital segment I, (GSII) genital segment II. Scale bar: 1.00 mm.

Head dorsally dark yellow to brown with longitudinal median line darker; ventrally dark yellow to orange. Antennomere I yellow, darker at apex; II-IV pale brown. Eyes dark brown. Rostrum yellowish-brown, except article IV dark brown. Pronotum pale brown to brown with transverse yellow to orange yellow band on anterior lobe, extending from one eye to the other, and longitudinal median carina of posterior lobe yellow to pale brown. Humeri slightly paler than rest of pronotum. Margins of pronotal punctuations dark brown to black. Sides of thorax brown to dark brown with area between prothorax and mesothorax (near pronotal humeri) marked by yellow to orange yellow. Venter of thorax brown, darker laterally and on intersegmental areas. Dorsum of abdomen orange brown to dark brown with outer portion of connectives contrasting in yellow or orange brown. Abdominal sternites orange brown to dark brown, paler posteriorly. Genital segments yellow to pale brown. Fore wings pale brown with one irregular whitish macula inside each closed cell and two near apex. Coxae and trochanters pale. Fore femur pale yellow. Mid and hind femora with base yellow, becoming pale brown or yellowish-brown apically. Tibiae pale brown. Tarsi pale brown to brown. Head well inserted into pronotum, sparsely covered by short brown setae. Antenna reaching well beyond humeri, almost to apex of pronotum. Antennomere I covered by thick dark setae; II-III covered by thinner longer setae. Antennomere I thickest, curved outward; II widening to apex, at apex thicker than III-IV; III cylindrical, slightly thinner than IV; IV fusiform. Rostrum slightly surpassing anterior margin of mesonotum.

Pronotum subpentagonal, divided into anterior and posterior lobe. Anterior lobe with transverse row of punctuations adjacent to anterior margin, interrupted centrally. Another row between anterior and posterior lobes, interrupted on longitu-

dinal median carina. Posterior lobe with several scattered punctuations and weak longitudinal median carina, fainting posteriorly. Humeri slightly elevated. Posterior angle of pronotum broadly rounded. Side of prothorax with two circular punctuations anteriorly and row on posterior intersegmental area. Rows of punctuations on intersegmental area between pro- and mesosternum, meso- and metasternum, and anterior and posterior margin of abdominal sternite I.

Abdominal connectives slightly elevated, densely covered by thick dark setae on outer margins, with apex rounded. Last abdominal tergite subquadrate, about as long as two preceding tergites. Abdominal sternite I broadly carinated medially. Remaining abdominal sternites unmodified. Posterior margin of last abdominal sternite broadly concave. Genital segment I wide dorsally, lateral margins slightly tapering, posterior margin concave (Fig. 2). Venter of genital segment I with posterior margin well exposed, broadly roundly excavated (Fig. 3). Genital segment II broad ventrally, flattened, slightly projected on posterolateral angles (Figs 3 and 4). Parameres greatly reduced, concealed inside genital segments.

Wings surpassing genital segments. Fore wings with four closed cells, two proximal and two distal. Legs relatively thin, without spines, tubercles, or modified groups of setae. Fore tibia widened distally. Mid femur at most as thick as hind femur.

Type-material. Brazil, *Amazonas*: Urucará, Lírio do Vale, Lago do Albano, U.V. light trap [-2.41418/-57.49993], 24.IX.2003, (P. de Marco & N. Ferreira-Jr.): 1 macropterous male [Holotype] (INPA), 1 macropterous male [Paratype] (DZRJ). Fonte Boa, Lago Ressaca Grande, U.V. light trap [-2.47399/-66.15474], 08.IX.2003, (N. Hamada & J. L. Nessimian): 2 macropterous males (DZRJ) [Paratypes]. Tefé, São João do Catuaí, Igarapé Jutaí, U.V. light trap [-3.69800/-64.15500], 15.IX.2003, (N. Hamada & J. L. Nessimian): 1 macropterous male (DZRJ) [Paratype]. Pará – Almeirim, Paraná do Tauaçui, Paraná, U.V. light trap [-1.17995/-51.79561], 08.X.2003, (P. de Marco & N. Ferreira-Jr.): 1 macropterous male (DZRJ).

Distribution. *Microvelia urucara* **sp. nov.** has been collected exclusively with light traps, near lakes and a stream from the Amazon River floodplain; no specimens have been collected in association with the hydrophytes sampled. The distributional range of this species along the Amazon River is of more than 1,500 km.

Etymology. This species is named after the municipality of Urucará, state of Amazonas, where the holotype was collected.

Remarks. The flattened ventral side of the relatively long second genital segment (Fig. 3) separates *M. urucara* **sp. nov.** from other Neotropical *Microvelia*, except for *Microvelia costaiana* Drake & Hussey, 1951 from Rio de Janeiro. The second genital segment is ventrally convex on the vast majority of species occurring in Tropical America, a feature that can be easily observed by placing the genital segments in lateral view. Besides being flattened, the second genital segment of *M. urucara* **sp. nov.** is projected on the posterolateral angles, a condition that is not common among Neotropical *Microvelia*. Both *M. urucara* **sp. nov.** and *M. costaiana* lack any conspicuous modification of the body and legs; tubercles and spines are absent. Based on the original description, both species can be separated by the color pattern, the head with a pair of broad yellowish stripes, legs dark fuscous-brown and venter of abdomen bluish-black in *M. costaiana*, whereas the head is entirely yellow or brown, legs are mostly yellow and abdomen brown in *M. urucara* **sp. nov.** They can also be separated by the shapes of the posterior margin of last abdominal sternite and of the dorsum of abdominal segment I, which are both truncate in *M. costaiana*, and concave in *M. urucara* **sp. nov.** Finally, specimens of *M. urucara* **sp. nov.** are distinctly shorter than those of *M. costaiana*, macropterous individuals of the first species are about 1.6 mm long, whereas apterous of the second are 2.0 mm long. Based on the drawing provided in the original description, *M. cavernula* Polhemus, 1972, from Venezuela, might have a flattened second genital segment, but this characteristic has not been mentioned in the description itself, or in the diagnosis of the species. The second genital segment is also relatively long, but lacking the posterolateral projections seen in *M. urucara* **sp. nov.** The shape of the last abdominal sternite also separates the two species, only *M. cavernula* bearing a deep posterior excavation.

Species collected and their distributions

The distributions of all specimens examined for the present study along the Amazon River floodplain are displayed on table II. Besides *M. urucara* **sp. nov.**, representatives of nine other veliid species have been collected and examined: *Microvelia mimula* White, 1879, *M. pulchella* Westwood, 1834, *M. summersi* Drake & Harris, 1928, *M. venustatis* Drake & Harris, 1933, *Paravelia capixaba* Moreira, Nessimian & Rúdio, 2010, *Rhagovelia jubata* Bacon, 1948, *Steinovelia virgata* (White, 1879), *Stridulivelia alia* (Drake, 1957), and *Stridulivelia raspa* (Hungerford, 1929).

Among the species cited above, only two had not yet been recorded from the Brazilian Amazon: *P. capixaba* and *M. summersi*. *Paravelia capixaba* was reported in 2010 from the state of Espírito Santo, Brazil, and no other records have been published then since. We acknowledge that the records presented here are very far from the type-locality. However, after comparing our exemplars with the types, including detailed analysis of the male proctiger and parameres, we are confident that they represent the same species. *Microvelia summersi* had been recorded from "Brazil" by Drake & Hussey (1955), but the record did not include further details. The species is also known from Grenada, Trinidad & Tobago, Panama and Guyana, and its occurrence in Northern Brazil was not unexpected.

In addition to these new records, *R. jubata* is recorded for the first time from the state of Amazonas, and *M. mimula*, *M. pulchella* and *M. venustatis* are recorded for the first time from the state of Pará.

Table II. Distribution of the Veliidae collected along the Amazon River floodplain, Brazil. Material collected on streams or lakes near the main sampling sites are marked by an exclamation mark. New records are displayed by "+" sign on the last three columns.

Species	Collecting stations	New records		
		Brazilian Amazon	Amazonas	Pará
Microvelia mimula	1A, 3, 4, 4!, 5, 15, 16, 17!, 18, 20, 22, 24, 25, 26	–	–	+
Microvelia pulchella	5, 7A, 11A, 14, 15, 16, 17, 19, 22, 25, 26	–	–	+
Microvelia summersi	5, 9, 15, 16, 19, 20	+	+	+
Microvelia urucara **sp. nov.**	5, 7!, 16, 25!	+	+	+
Microvelia venustatis	2!, 4, 5, 11A, 14, 15, 16, 20, 26	–	–	+
Paravelia capixaba	3	+	+	–
Rhagovelia jubata	7!	–	+	–
Steinovelia virgata	14, 15, 16	–	–	–
Stridulivelia alia	14!	–	–	–
Stridulivelia raspa	5	–	–	–

ACKNOWLEDGEMENTS

This study was partially supported by the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Fundação de Amparo e Desenvolvimento da Pesquisa (FADESP) and Pró-Várzea/IBAMA Project: Bases Científicas para a Conservação da Várzea – Identificação e Caracterização de Regiões Biogeográficas (coordinated by Ana L. Albernaz).

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Submitted: 16.VII.2011; Accepted: 28.VIII.2011.
Editorial responsibility: Gabriel L.F. Mejdalani