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Taxonomic revision of the Neotropical genus *Oiovelia* (Hemiptera: Heteroptera: Veliidae)

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Abstract. The genus *Oiovelia* Drake & Maldonado-Capriles, 1952 includes foam-inhabiting insects that occur from Venezuela to Argentina and contains four previously described species: *Oiovelia brasiliensis* Moreira, Nessimian & Rúdio, 2010, *O. cunucunumana* Drake & Maldonado-Capriles, 1952, *O. rivicola* Spangler, 1986, and *O. spumicola* Spangler, 1986. A redescription of the genus, diagnostic information on the four described species, description of four new species from Brazil (*O. chenae* sp. nov., *O. hamadae* sp. nov., *O. pydanieli* sp. nov., and *O. viannai* sp. nov.), an identification key, photos, and illustrations of male genitalia of all the species are herein presented. To facilitate separation of the New World genera of the subfamily Veliinae, an updated identification key is also presented.

Key words. Heteroptera, Gerromorpha, Veliidae, aquatic insects, foam, identification key, new species, Brazil, South America, Neotropical Region

Introduction

The water striders of the genus *Oiovelia* Drake & Maldonado-Capriles, 1952 (Veliidae: Veliinae) are semi-aquatic insects, living predominantly on foam formed on the surface of black water streams, occasionally being collected on tree trunks, kinon [= allochthonous organic material, as flowers, fruits and wood, drifting on the water surface and accumulated in the stream banks (Fittkau 1977)], or more rarely attracted to light traps (Spangler 1986, Moreira et al. 2010). At present, representatives of the genus *Aphrovelia* Polhemus & Polhemus, 1988, restricted to Madagascar, and *Pseudovelia gnoma* Polhemus, 1979, recorded from Sri Lanka, in addition to *Oiovelia*, are the only semi-aquatic Heteroptera collected on foam (Andersen 1983, Polhemus

& Polhemus 1988). Among these three genera, *Oiovelia* is the one able to colonize the interior of foam masses forming galleries, unlike the other two, which live only on the surface. Considering that these are phylogenetically distant genera, the habit of living on foam probably evolved independently at least twice in the family (Polhemus & Polhemus 1988).

Oiovelia was established by Drake & Maldonado-Capriles (1952) to include a single species collected in Venezuela, *O. cunucunumana* Drake & Maldonado-Capriles, 1952. Three years later, Drake & Roze (1955) reported this species from Paraguay and described the previously unknown male. After more than thirty years, Spangler (1986) described two other species also from Venezuela, *O. spumicola* Spangler, 1986 and *O. rivicola* Spangler, 1986, and recorded *O. cunucunumana* from Brazil and Peru. More recently, Mazzucconi (in Torres et al. 2007) synonymized *Paravelia correntina* Iglesias & Crespo, 1999, described from Argentina (Iglesias & Crespo 1999), with *O. cunucunumana*. Finally, Moreira et al. (2010) described *O. brasiliensis* from the State of Espírito Santo, southeastern Brazil. Other articles related to the genus *Oiovelia* have also been published since its description, involving notes on immature stages (Mazzucconi & Bachmann 1997b) and new distributional records (Mazzucconi & Bachmann 1997a; Moreira & Barbosa 2011, 2012; Moreira & Campos 2012; Moreira et al. 2012; Rodrigues et al. 2012).

In this study, after examination of part of the type-material belonging to the species of the genus, additional material deposited in collections, and insects recently collected in Brazil, it was possible to obtain details of the diagnostic characters of the four known *Oiovelia* species, and to describe four new species which are illustrated and compared with morphologically similar congeners. Colored photos of dorsal view and illustrations of male genitalia for all species of *Oiovelia* are provided. In addition, an illustrated taxonomic key to the Veliinae genera occurring in the Americas is presented.

Material and methods

Digital images were obtained with a Leica DFC420 camera attached to a Leica M165C binocular microscope, processed using Leica Application Suite V.3.7.0, and stacked using Auto-Montage. Drawings of the genital segments of male were made with a camera lucida on a stereo microscope; the parameres were drawn from temporary microscopic slides. All measurements are given in millimeters and were always taken in their maximum dimensions; lengths were measured at the midline.

Abbreviations of morphological terms are used as follows: body length (BL), head length (HL), head width through eyes (HW), length of antennomeres I–IV [without intersegmental pieces] (ANT I, ANT II, ANT III, ANT IV), maximum eye width (EYE), pronotum length on midline (PL), pronotum width (PW), length of fore leg segments (FORE LEG), length of mid leg segments (MID LEG), length of hind leg segments (HIND LEG), femoral length (FEM), tibial length (TIB), length of tarsomeres I–III (TAR I, TAR II, TAR III); apterous (apt), macropterous (macr).

The characters mentioned in the redescription of the genus were not repeated in the descriptions of the new species. Pruinose areas present in each species, in general, are best

viewed using a specific illumination angle; these are: areas of anterior lobe of pronotum with anterior illumination; posterior lobe with anterior or lateral illuminations; and lateral areas of abdominal segments with posterior illumination.

Studied insects consist of ethanol preserved and dry-mounted specimens from museums, institution collections, or recently collected ones using mainly aquatic nets. These specimens are deposited in the following collections:

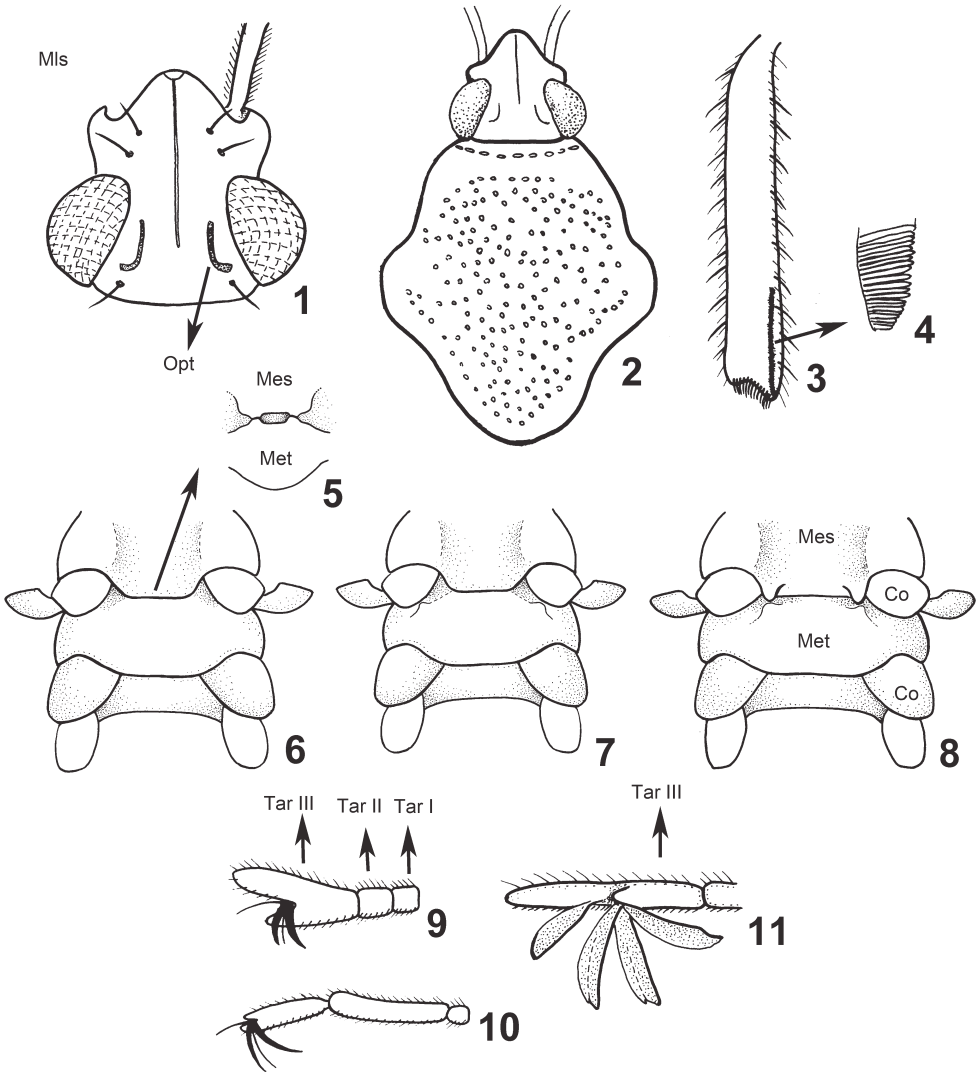
CZNC Zoological Collection Norte Capixaba, Universidade Federal do Espírito Santo, São Mateus, Brazil;
DPIC Invertebrates Collection, Departamento de Parasitologia, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil;
INPA Invertebrates Collection, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil;
MZSP Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil;
NMPC National Museum, Prague, Czech Republic.

Results

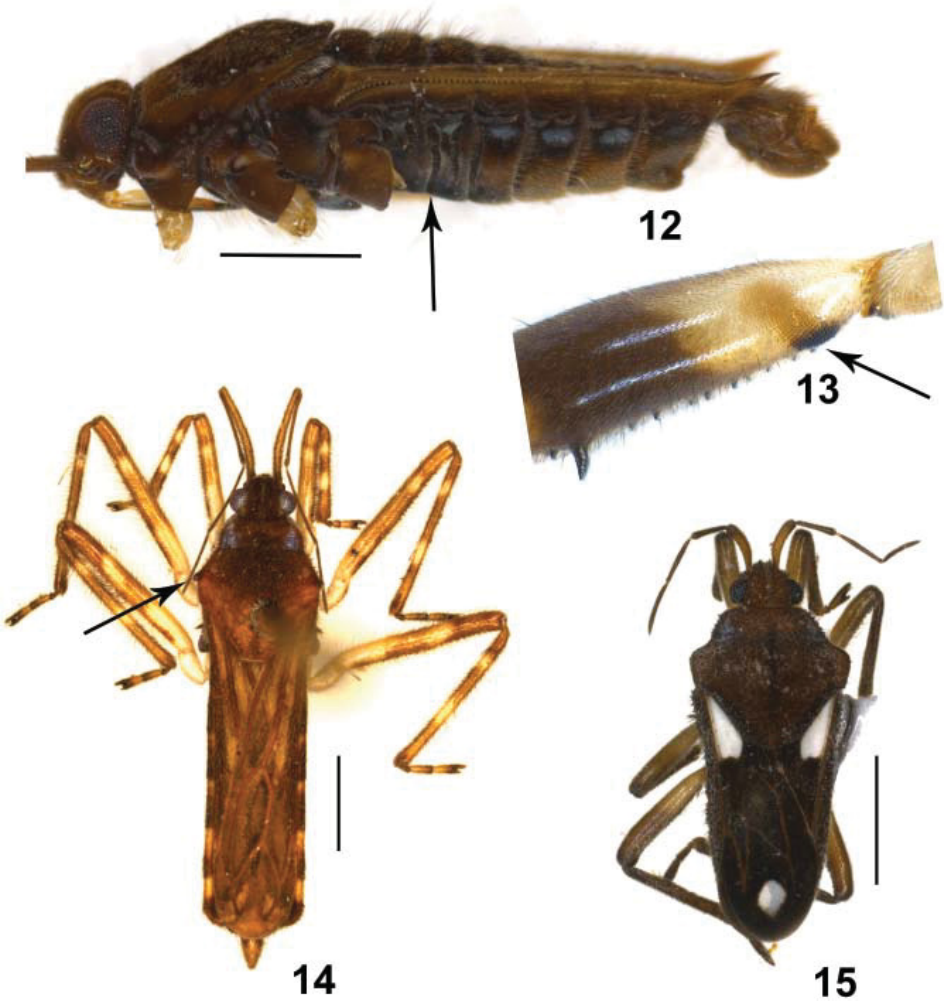
Key to the genera of Veliinae of the New World

Modified and updated from Andersen (1982) and Nieser & Melo (1997):

1 Middle and hind tarsi with claws and arolia modified, forming four falciform structures (Fig. 11). ..... ***Veloidea*** Gould, 1934 [Central America and northern South America]
– Middle and hind tarsi with setae-shaped arolia and two falcate claws (Figs 9–10). 2
2 Abdominal segments with transverse lateral sulci; hind femora and connexival margin usually with stridulatory devices (Figs 12–13). ..... ***Stridulivelia*** Hungerford, 1929 [Neotropical Region]
– Abdominal segments without transverse sulci (Figs 78–80); stridulatory devices usually absent (except for *Paravelia stenoptera* Polhemus & Polhemus, 1984). 3
3 Metasternum with a pair of lateral tubercles (Figs 7–8). 4
– Metasternum without lateral tubercles (Fig. 6). 5
4 Internal margin of mesoacetabula with a pair of tubercles in front of the tubercles of metasternum (Fig. 8); humeral angles without spines or projections. ..... ***Platyvelia*** Polhemus & Polhemus, 1993 [southern U.S.A. and Neotropical Region]
– Mesoacetabula without tubercles (Fig. 7); humeral angles usually forming small spines or projections (Fig. 14). ..... ***Steinovelia*** Polhemus & Polhemus, 1993 [southern U.S.A. and Neotropical Region]
5 Middle leg with tarsomere II usually about 2× longer than tarsomere I; tarsomere III of all legs expanded laterally, with divergent margins (Fig. 9); macropterous form with only a pair of basal maculae, remainder of wings only with pruinose areas (Figs 26–28); 3.10–4.15 mm. ..... ***Oiovelia*** Drake & Maldonado-Capriles, 1952 [South America]



Figs 1–11. 1 – dorsal view of the head of *Oiovelia*; 2 – dorsal view of the head and pronotum of *Oiovelia*; 3 – inner view of the protibia showing the grasping comb; 4 – detail of grasping comb; 5 – detail of intersegmental area between the meso- and metasternum showing two pairs of small tubercles; 6 – ventral view of meso- and metasternum of *Paravelia*; 7 – ventral view of *Steinovelia*; 8 – ventral view of *Platyvelia*; 9 – tarsomeres of middle leg of *Oiovelia*; 10 – tarsomeres of middle leg of *Paravelia*; 11 – tarsomere III of middle leg of *Veloidea* (modified from Andersen 1982). Abbreviations: Cox – coxa, Mes – mesosternum, Met – metasternum, Mls – median longitudinal suture, Opt – oblique punctation, Tar – tarsomere.



Figs 12–15. 12 – lateral view of *Stridulivelia* (legs removed) (arrow indicates the transverse sulci); 13 – part of the hind femur of *Stridulivelia* in dorsal view (arrow indicates the stridulatory devices); 14 – dorsal view of *Steinovelia virgata* (White, 1879) (arrow indicates the small projections of humeri); 15 – dorsal view of *Paravelia splendoris* (Drake & Harris, 1933). Scale bars = 1 mm.

– Middle leg with tarsomere II usually 4–5× longer than tarsomere I; tarsomere III of all legs subcylindrical, with parallel margins (Fig. 10); macropterous form usually with a pair of basal maculae and another apical macula (Fig. 15); 2.30–9.00 mm. .... ***Paravelia*** Breddin, 1898
[Neotropical Region, except *P. taipiensis* (Cheesman, 1926) from Marquesas Islands, eastern Pacific]

Figs 16–21. Streams where part of the *Oiovelia* specimens examined were collected. 16–19 – Presidente Figueiredo, Amazonas, Brazil: 16 – Cachoeira do Santuário. 17 – Igarapé da Onça. 18 – detail of the typical formation of foam on the black water stream. 19 – detail of *Oiovelia* specimens on the foam. 20–21 – Luz, Minas Gerais, Brazil: Ribeirão Jorge Grande.

Oiovelia Drake & Maldonado-Capriles, 1952

Oiovelia Drake & Maldonado-Capriles, 1952: 51 (original description). Type-species: *Oiovelia cunucunumana* Drake & Maldonado-Capriles, 1952, by original designation.

Redescription. Polymorphism within the genus is common, with macropterous (Figs 26–28) and apterous (Figs 22–23) forms. General body color usually brownish (Fig. 23), varying from dark brown, almost black (Figs 55–58), to yellow (Figs 32–34), with whitish pruinose areas. Body length usually between 3.00 and 4.30 mm. Body without modified setae similar to minute dark spines. Head elongated and deflected in front of eyes (Figs 78–80), with a pair of oblique punctations on posterior region, near inner margin of eyes (Figs 1–2). Eyes globose, separated by a distance greater than eye width, located on posterior portion of the head, adjacent to anterior margin of pronotum. Ocular setae always present, with a pair on each eye. Rostrum reaching mesocoxa (Fig. 25), with segment III distinctly longer than others.

Pronotum in both apterous and macropterous forms long, covering meso- and metanotum, with lateral area of anterior lobe with long dark setae, and a row of rounded punctations adjacent to anterior margin; posterior lobe covered by same punctations, with posterior angle rounded (Fig. 2); whitish pruinose areas usually present on anterior lobe and/or posterior lobe (Figs 29, 54). Apterous form with humeral angles not elevated. The contrary occurs in the macropterous form, with humeral angles slightly elevated, and usually dark brown fore wings reaching genital segments; the two basal cells smaller than the two apical cells; when closed, forming a pair of basal maculae near humeral angles, varying from whitish (Fig. 26) to yellowish (Fig. 27); in addition to these maculae, rest of wing with whitish pruinosity, which can be uniform and covering almost entire wing (Figs 24, 26–27) or well delimited between cells (Figs 47–49, 50–51). Propleura, mesopleura, and prosternum with rounded punctations. Intersegmental region between meso- and metasternum always with two pairs of small tubercles medially (Fig. 5). Legs without modifications or spines; tarsi three-segmented; tarsomeres I–II short, III longer and wider than previous; tarsomere II of mid leg usually at most 2× longer than I; tarsomere III expanded, with lateral margins divergent; pretarsus composed of a pair of symmetrical, falciform claws and a pair of setae-like aroliae (Fig. 9); these structures are inserted in a median cleft that divides tarsomere III into two lobes, where external one is twice the size of the internal one. Male presents a grasping comb on inner margin of protibia, absent in female (Figs 3–4).

Abdomen in both sexes without modifications, usually with whitish pruinose areas laterally; posterior angle of last connexival segment not developed (Figs 78–80). *Males*: connexiva horizontal to slightly elevated; apterous form with six visible tergites (Fig. 32); sternite VII without projections or lobes on posterior margin (Fig. 34); pygophore simple, with pilosity on posterior half; proctiger with an acute projection (Fig. 46), spines (Fig. 37) or without modifications (Fig. 40); parameres symmetrical, elongated and slightly curved (Figs 71–77). *Females*: connexiva elevated; apterous form with seven visible tergites, generally with part of the connexives reflected over abdomen (Figs 23, 33, 56); proctiger small, globose; first gonocoxa plate-like (Figs 78–80).

Differential diagnosis. In *Oiovelia*, specimens with high variation of color and pruinosity are common. Also, some species are morphologically very similar, differing basically in the color and male genitalia. For this reason, even when having a few specimens, it is necessary to examine male characters to confirm the species identification. However, species of the genus usually have gregarious behavior, and are consequently easily collected in large numbers. In foam masses, where these insects preferably live (Figs 16–19), it is common to observe several couples in copulation, and nymphs of all instars. When compared with other Neotropical veliids, the genus *Oiovelia* has the most active flight behavior, and the migration of specimens between the foam masses is frequently observed in the field. In addition, two species have already been collected at the same locality (e.g., *O. cunucunumana* with *O. rivicola*; and *O. cunucunumana* with *O. viannai* sp. nov.), which may lead to misidentifications. The existing records of the genus are from northern South America, southeastern Brazil and Argentina, regions with specialists working with this group of insects. Thus, there is an evident gap in collecting sites in the other South American countries as well as in central-western and northeastern Brazil, where the species of the genus possibly also occur.

Oiovelia is very similar to the Neotropical genus *Paravelia* Breddin, 1898, differing from the latter mainly in the form of tarsomere III of all legs, which is expanded, with lateral margins slightly divergent (Fig. 9), whereas in *Paravelia* the tarsomere III is either cylindrical or subcylindrical, with lateral margins parallel (Fig. 10). In addition, the fore wings of *Oiovelia* have only a pair of basal maculae starting near the humeral angles, with the rest of the wing at most with pruinosity (Fig. 26). In *Paravelia*, the fore wings usually have a pair of basal maculae and another apical macula (Fig. 15), with a wide variety of sizes and forms. In some species, however, the apical macula may be absent (e.g., *P. basalis* (Spinola, 1837) and *P. itatiayana* Drake 1951). On the other hand, *Paravelia bullialata* Polhemus & Polhemus, 1984 and *P. splendoris* (Drake & Harris, 1933) (Fig. 15) have the form of the tarsomere III very similar to the species of *Oiovelia*, which most likely represents convergent character.

Until now, no phylogenetic studies concerning the Neotropical Veliinae have been available from literature, and Polhemus (1976) and Andersen (1982) commented that *Oiovelia* (monotypic at that time) could be just a subgenus or a species group within the genus *Paravelia*. In this study, we observed that besides the form of the tarsomere III, hitherto the main diagnostic character of the genus, other characters remain constant within the species, such as: absence of black denticles on the body; presence of a pair of oblique punctations on posterior region of head; absence of silver or whitish pubescence on the anterior lobe of pronotum; long dark setae present laterally on the anterior lobe of pronotum; posterior angle of pronotum rounded; fore wings without apical macula; legs without spines, teeth or denticles; two pairs of small tubercles on intersegmental region between the meso- and metasternum; and posterior angle of last connexival segment not developed, rounded. In addition to morphology, *Oiovelia* species are predominantly inhabitants of foam masses on streams, and so far no species of *Paravelia* has been correctly recorded from this environment.

Checklist of the species of *Oiovelia*

O. brasiliensis Moreira, Nessimian & Rúdio, 2010
O. chenae Rodrigues & Melo **sp. nov.**
O. cunucunumana Drake & Maldonado-Capriles, 1952
= *Paravelia correntina* Iglesias & Crespo, 1999
O. hamadae Rodrigues & Melo **sp. nov.**
O. pydanieli Rodrigues & Melo **sp. nov.**
O. rivicola Spangler, 1986
O. spumicola Spangler, 1986
O. viannai Rodrigues & Melo **sp. nov.**

Key to the species

The key is applicable to males and females, apterous and macropterous; however, due to the variation of some diagnostic morphological characters, females will probably have to be identified by association with males.

1. Head, legs and pronotum creamy yellow in apterous form (Figs 32–33); pronotum reddish brown on anterior third in macropterous form; proctiger of male with a small conical process on half of dorsal surface; paramere wide on base, tapering distally, with a hook-like apex (Fig. 46). ..... ***O. spumicola*** Spangler, 1986
– Head, legs and pronotum reddish brown (Figs 29–31), orange brown (Figs 26, 28), or blackish (Figs 55–57) in apterous and macropterous forms; proctiger of male without small conical process on dorsal surface; apex of paramere rounded (Figs 71–72, 74–77) or subtruncate (Fig. 73). 2
2. Fore wings with whitish pruinose areas well delimited between cells (Figs 47–49, 50–51, 52–53) (apterous form unknown). 3
– Fore wings with a uniform and faint whitish pruinosity covering their entire surface (Figs 24, 26–28, 57), at most absent on a small portion bellow basal maculae (Figs 29–31) (apterous forms of *O. brasiliensis* and *O. viannai* sp. nov. are known). 5
3. Pronotum uniformly colored, varying from orange to reddish brown (Figs 52–54); mesocoxae brown to dark brown (Fig. 80); paramere slightly tapering to apex (Fig. 76). .... ***O. pydanieli*** **sp. nov.**
– Pronotum varying from orange brown to reddish brown, with anterior lobe dark brown to blackish (Figs 47–49, 50–51); mesocoxae yellow to yellowish brown (Figs 78–79); if paramere tapering to apex (Fig. 74) the proctiger has a slight depression on dorsal surface (Fig. 61). 4
4. Major part of propleura and all mesopleura dark brown to black (Fig. 78); proctiger of male with a slight depression on dorsal surface of posterior half (Fig. 61); paramere slightly tapering to apex (Fig. 74). ..... ***O. chenae*** **sp. nov.**

– Pro- and mesopleura with dorsal half orange brown and ventral half dark brown (Fig. 79); proctiger of male without depression on posterior half (Fig. 64); paramere slightly narrowed medially (Fig. 75). ..... ***O. hamadae* sp. nov.**

5. Posterior lobe of pronotum with an evident whitish pruinose area, generally V-shaped (Figs 29–31); paramere narrowed medially and distinctly widening to apex on dorsal surface (Fig. 73) (apterous form unknown). ..... ***O. rivicola*** Spangler, 1986

– Pruinose area on posterior lobe of pronotum, if present, with irregular form (Figs 22, 24, 57); paramere not distinctly widening on dorsal surface (Figs 71–72, 77). 6

6. Margin of pronotum, abdomen and legs with several long dark brown setae (Figs 22–25); proctiger of male with two small spines medially on dorsal surface (Fig. 37); female with a slight constriction laterally on abdominal segments III–IV (Fig. 25). .... ***O. brasiliensis*** Moreira, Nessimian & Rúdio, 2010

– At most margin of anterior lobe of pronotum and legs with long dark brown setae (Figs 26–28, 55–57); proctiger of male without spines on dorsal surface (Figs 40, 70); female without constriction on abdominal segments (Fig. 58). 7

7. Head and pronotum dark brown to black (Figs 55–57); paramere with a slight expansion on ventral surface of posterior half and few setae along dorsal and ventral surfaces (Fig. 77). ..... ***O. viannai* sp. nov.**

– Posterior margin of head and pronotum orange brown to reddish brown (Figs 26–28); paramere without expansion on ventral surface, with several setae on dorsal and ventral surfaces (Fig. 72) (apterous form unknown). .... ***O. cunucunumana*** Drake & Maldonado-Capriles, 1952

Redescriptions of previously described species

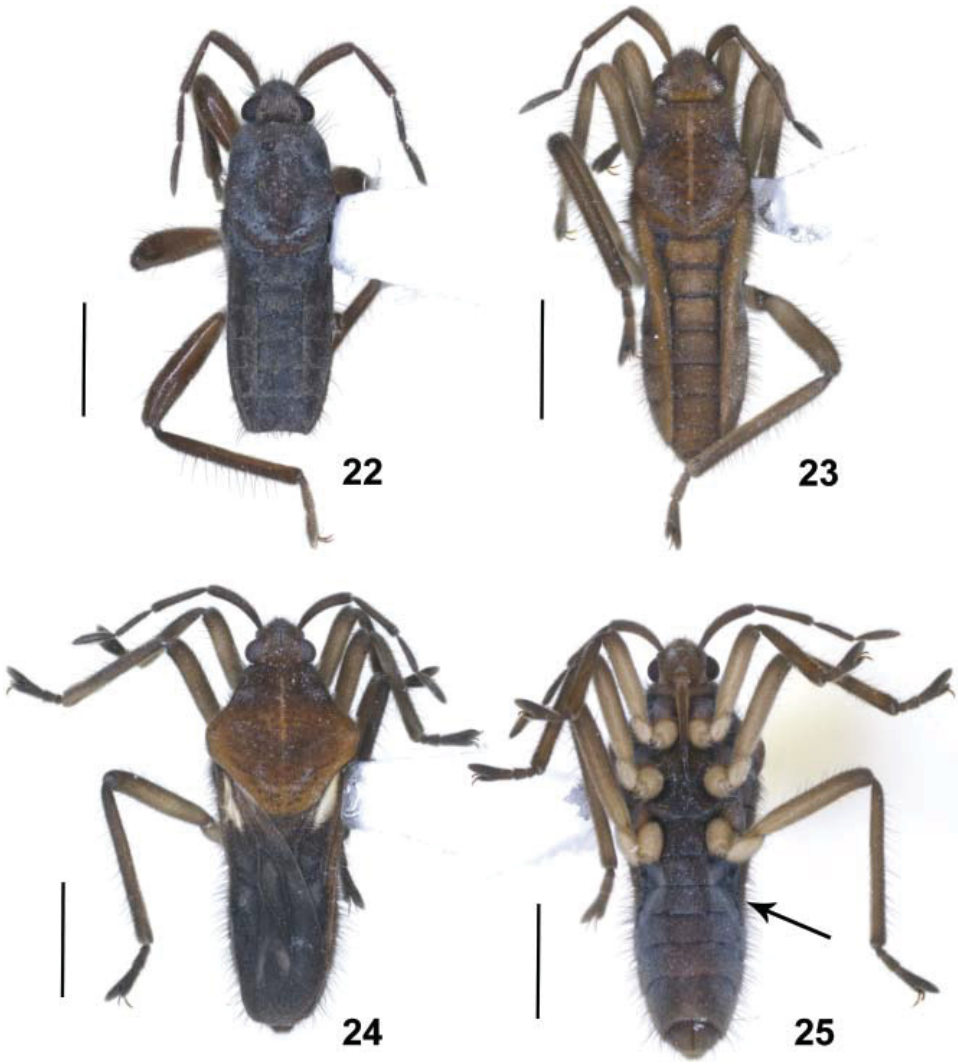
Oiovelia brasiliensis Moreira, Nessimian & Rúdio, 2010

(Figs 22–25, 35–37, 71)

Oiovelia brasiliensis Moreira, Nessimian & Rúdio, 2010 in Moreira et al. (2010): 2763 (original description).
Oiovelia brasiliensis: Moreira & Barbosa (2011): 11 (new records); Moreira & Barbosa (2012): 64 (new records); Moreira & Campos (2012): 545 (new record); Rodrigues et al. (2012): 911 (new record).
Oiovelia cunucunumana (misidentification): Moreira & Barbosa (2011): 11 (partim).

Type locality. Brazil, Espírito Santo, Pinheiros.
Type material examined. Paratypes: **BRAZIL: Espírito Santo**: 1 ♂ 2 ♀♀ (apt) (CZNC), Pinheiros, Reserva Ecológica Córrego dos Veados, Córrego Água Limpa, foam, -18.36776°/ -40.13944°, 86 m a.s.l., 10.ii.2009, F.F.F. Moreira coll.; 1 ♀ (macr) (CZNC), Santa Teresa, Reserva Biológica Augusto Ruschi, Cachoeira Grande, foam, 19°52′30.1″″S/ 40°33′21.9″W, 704 m a.s.l., 20.ii.2009, J.A. Rúdio & F.F. Salles coll.
Additional material examined. BRAZIL: Minas Gerais: 2 ♂♂ (apt) (DPIC), Ipoema, 13.ix.2001, A.L. Melo coll.; 2 ♀♀ (apt) (DPIC), Serra do Cipó, 17.iv.1999, A.L. Melo coll.; 1 ♀ (macr) (DPIC), Santana do Riacho, Lapinha da Serra, 19°10′08″S/ 43°42′51″W, Cachoeira do Paraíso, 29.i.2011, H.D.D. Rodrigues coll. [same material examined by Rodrigues et al. (2012)]. **São Paulo**: 1 ♂ (apt) (MZSP), Salesópolis, Estação Biológica Boracéia, Ribeirão Venerando, 27–28.v.1965, C.G. Froehlich coll. [misidentified by Moreira & Barbosa (2011) as *O. cunucunumana*].

Dimensions. ***Apterous male*** (n = 2; mm). BL 3.25–3.29; HL 0.50–0.55; HW 0.65–0.67; ANT I 0.60–0.62, ANT II 0.45–0.50, ANT III 0.35, ANT IV 0.40–0.42; EYE 0.17; PL 1.12–1.20; PW 1.00–1.02; FORE LEG: FEM 0.80–0.87, TIB 0.81–0.86, TAR I 0.06, TAR II 0.07, TAR III 0.37; MID LEG: FEM 1.04–1.07, TIB 1.13–1.15, TAR I 0.07, TAR II 0.11–0.12, TAR



Figs 22–25. *Oiovelia brasiliensis* Moreira, Nessimian & Rúdio, 2010. 22–24 – dorsal view: 22 – apterous male paratype (genital segments removed); 23 – apterous female; 24 – macropterous female; 25 – ventral view of macropterous female (arrow indicates the constriction of abdominal segments III–IV). Scale bars = 1 mm.

III 0.40; HIND LEG: FEM 1.17–1.25, TIB 1.42–1.50, TAR I 0.08–0.10, TAR II 0.14–0.17, TAR III 0.40–0.41.

Apterous female (n = 3; mm). BL 3.40–3.80; HL 0.53–0.55; HW 0.65–0.67; ANT I 0.62–0.65, ANT II 0.50–0.51, ANT III 0.37–0.40, ANT IV 0.43–0.45; EYE 0.16–0.20; PL 1.19–1.30; PW 0.97–1.00; FORE LEG: FEM 0.81–0.89, TIB 0.83–0.87, TAR I 0.07, TAR II 0.07, TAR III 0.36; MID LEG: FEM 1.12–1.18, TIB 1.16–1.18, TAR I 0.08, TAR

II 0.12–0.14, TAR III 0.38–0.40; HIND LEG: FEM 1.23–1.30, TIB 1.50, TAR I 0.08–0.09, TAR II 0.15–0.18, TAR III 0.40–0.45.

Macropterous female (n = 1; mm). BL 3.92; HL 0.62; HW 0.70; ANT I 0.65, ANT II 0.52, ANT III 0.37, ANT IV 0.42; EYE 0.17; PL 1.45; PW 1.50; FORE LEG: FEM 0.92, TIB 0.90, TAR I 0.07, TAR II 0.07, TAR III 0.40; MID LEG: FEM 1.17, TIB 1.25, TAR I 0.08, TAR II 0.12, TAR III 0.45; HIND LEG: FEM 1.36, TIB 1.55, TAR I 0.08, TAR II 0.15, TAR III 0.42.

Diagnostic characters. Color of head and pronotum dark reddish brown to reddish brown. Body and legs covered by long dark setae. Coxae, trochanters and femora light brown to yellowish, with remaining segments of the legs brown to dark brown (Fig. 25). Fore wings in macropterous form reaching the genital segments, dark brown, with the veins slightly lighter, and a pair of pale yellowish maculae at the base, starting from humeri and surpassing the apex of pronotum; entirely covered by whitish pruinosity, more evident between the cells (Fig. 24). Proctiger of the male with a pair of small spines on half of the dorsal surface (Fig. 37). Paramere with ventral surface widening in the posterior half (Fig. 71). Female abdomen with a slight lateral constriction on segments III–IV (Fig. 25).

Intraspecific variation. We observed substantial variation in color and pilosity. Some specimens have the tegument of the body and legs orange brown to yellowish brown. We examined an apterous male (in MZSP) that had few setae along the margins of the body, possibly lost over the time. Also the spines of the male proctiger varied slightly in size.

Differential diagnosis. This species is known from apterous and macropterous form, and has *O. viannai* sp. nov. as a morphologically similar species. It differs from the later in the body color, ranging from brownish to reddish brown, presence of a pair of spines on male proctiger, and abdominal segment III–IV of the female slightly constricted, whereas in *O. viannai* the body is dark brown to blackish and spines on male proctiger and constriction on female abdomen are absent.

Distribution and habitat. Brazil: Minas Gerais (Rodrigues et al. 2012; present study), border of Minas Gerais and Rio de Janeiro (Moreira & Barbosa 2012), Espírito Santo (Moreira et al. 2010), São Paulo (Moreira & Barbosa 2011; present study), Rio de Janeiro (Moreira et al. 2012) and Rio Grande do Sul (Moreira & Campos 2012).

This species was described from the state of Espírito Santo, southeastern Brazil, and later recorded in other four states of Brazil. Generally, it is collected in small numbers of specimens and may or may not be found on foam masses.

Oiovelia cunucunumana Drake & Maldonado-Capriles, 1952

(Figs 26–28, 38–40, 72)

Oiovelia cunucunumana Drake & Maldonado-Capriles, 1952: 51 (original description).

Oiovelia cunucunumana: Drake & Roze (1955): 107 (description of male, new records); Spangler (1986): 449 (new records, identification key, illustration of male genitalia); Mazzucconi & Bachmann (1997a): 62 (new records); Mazzucconi & Bachmann (1997b): 66 (description of immature stages); Moreira & Barbosa (2011): 11 (new records); Moreira et al. (2011): 19 (catalogue); Rodrigues et al. (2012): 911 (new records).

Paravelia correntina Iglesias & Crespo, 1999: 259 (original description). Synonymized by Mazzucconi in Torres et al. (2007: 143).

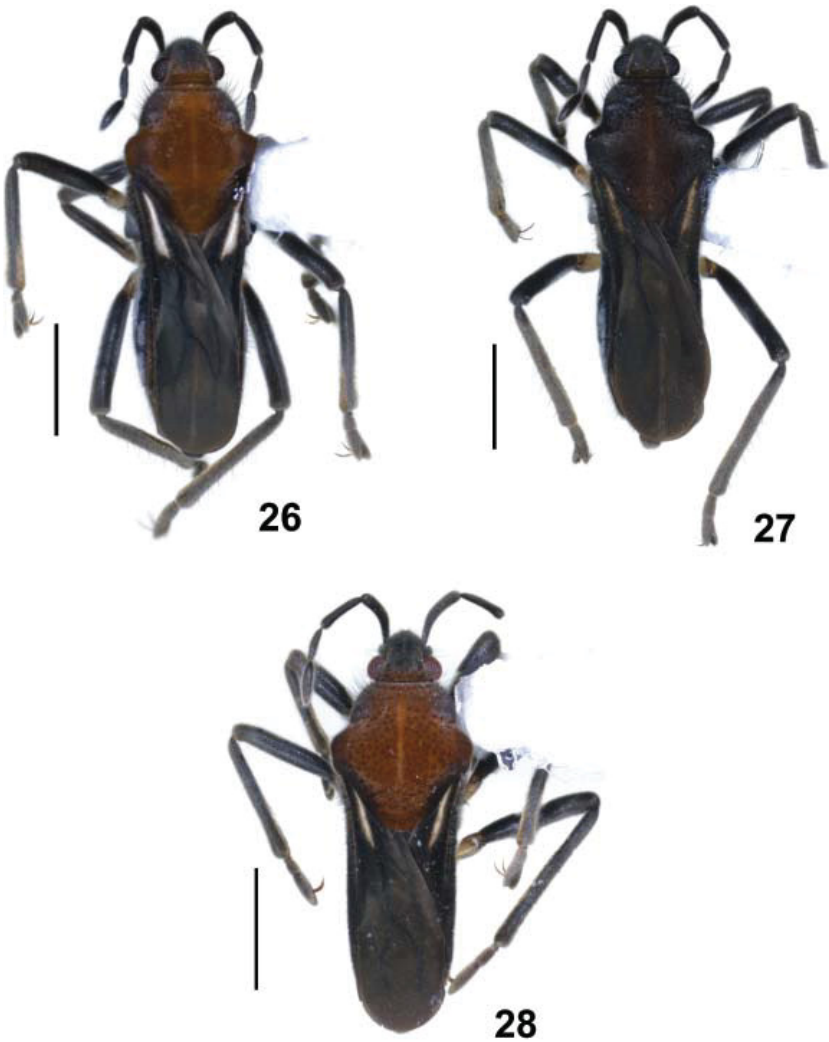
Type locality. Venezuela, Amazonas, Cerro Culebra.

Material examined. All specimens macropterous. **BRAZIL: Amapá:** 4 ♂♂ 7 ♀♀ 12 nymphs (INPA), Serra do Navio, Rio Cachaço, Cachoeira do Fernando, 00°53′18.8″N/ 52°01′22.9″W, 02.viii.2011, A.M.O. Pes, P.V. Cruz & A.S. Fernandes coll. [in part, same material examined by Rodrigues et al. (2012)]. **Amazonas:** 2 ♂♂ 7 ♀♀ 4 nymphs (INPA), Barcelos, Comunidade Ucuqui, Rio Jauari, 23.vii.2009, N. Ferreira-Jr & J.L. Nessimian coll. [in part, same material examined by Rodrigues et al. 2012]; 10 ♂♂ 13 ♀♀ (DPIC), Presidente Figueiredo, AM-240, Km 12, Reserva Ecológica Cachoeira do Santuário, 02°03′43″S/ 59°55′44″W, 03.vii.2002, D.L.V. Pereira coll.; 11 ♂♂ 6 ♀♀ (DPIC), same data of the previous locality, except 15.x.2002; 5 ♂♂ 5 ♀♀ (INPA), same data, except 30.vi.2011, H.D.D. Rodrigues coll.; 18 ♂♂ 20 ♀♀ 4 nymphs (INPA), Presidente Figueiredo, AM-240, Km 13, Cachoeira da Porteira, 02°02′15″S/ 59°54′53″W, 30.vi.2011, H.D.D. Rodrigues coll.; 16 ♂♂ 8 ♀♀ 9 nymphs (INPA), same data of the previous locality, except 16.viii.2011; 5 ♂♂ 2 ♀♀ (DPIC), Presidente Figueiredo, AM-240, Km 20, Igarapé da Onça, Balneário Sossego da Pantera, 02°02′34″S/ 59°51′08″W, 11.ix.2002, D.L.V. Pereira coll.; 24 ♂♂ 32 ♀♀ 44 nymphs (INPA), same data of the previous locality, except 29.vi.2011, H.D.D. Rodrigues coll.; 13 ♂♂ 19 ♀♀ 14 nymphs (INPA), same data, except 17.viii.2011; 12 ♂♂ 6 ♀♀ 3 nymphs (INPA), Presidente Figueiredo, AM-240, Km 20, Sítio Santo Amaro, 02°04′05″S/ 59°54′28.8″W, 18.viii.2011, H.D.D. Rodrigues coll.; 1 ♂ 1 ♀ 6 nymphs (INPA), Presidente Figueiredo, Balneário Marupiara, 02°07′S/ 60°06′W, 01.vii.2011, H.D.D. Rodrigues coll.; 6 ♂♂ 7 ♀♀ (DPIC), Presidente Figueiredo, Igarapé Canoas, igarapé II do ramal do Castanhal, BR-174, Km 135, 01º49′51″S/ 60º04′15″W, 10.ix.2002, D.L.V. Pereira coll.; 17 ♂♂ 10 ♀♀ (DPIC), Presidente Figueiredo, Vivenda Fênix, ramal do Urubuí, Km 9, 02º03′00″S/ 60º06′09″W, 16.x.2002, D.L.V. Pereira coll.; 13 ♂♂ 13 ♀♀ (DPIC), Presidente Figueiredo, BR-174, Km 110, Rio Urubuí, 02º01′05″S/ 60º02′04″W, 10.x.2002, D.L.V. Pereira coll.; 28 ♂♂ 24 ♀♀ (DPIC), same data of the previous locality, except Igarapé Camarão, 01º01′05″S/ 60º02′02″W; 1 ♂ 2 ♀♀ (DPIC), same data, except Cachoeira Santa Cláudia, 02º02′17S/ 60º00′55″W, 11.ix.2002; 11 ♂♂ 5 ♀♀ (DPIC), Presidente Figueiredo, Cachoeira Iracema, 01º59′10″S/ 60º03′44″W, 09.x.2002, D.L.V. Pereira coll.; 4 ♂♂ 6 ♀♀ (DPIC), Presidente Figueiredo, Balneário Água Viva, 02º03′11″S/ 59º55′24″W, 15.x.2002, D.L.V. Pereira coll.; 2 ♂♂ (DPIC), Presidente Figueiredo, BR-174, Km 113, Igarapé das Lajes, 12.ix.2002, D.L.V. Pereira coll.; 15 ♂♂ 18 ♀♀ (DPIC), 2 ♂♂ 2 ♀♀ (NMPC), Presidente Figueiredo, AM-240, Igarapé do Mutum, 02º02′15″S/ 59º54′53″W, 10.x.2002, D.L.V. Pereira coll.; 73 ♂♂ 51 ♀♀ 31 nymphs (INPA), São Gabriel da Cachoeira, Igarapé Miuá, downstream of the waterfall hydroelectric, 00°06′33.2″S/ 66°52′24.2″W, 24.viii.2011, R.L.Ferreira-Keppler, P.V. Cruz, A.S. Fernandes & E.A. Reis coll. **Pará:** 1 ♂ 3 ♀♀ (INPA), BR-230, Rio Jaú, 23.iv.1988, U. Barbosa coll.; 10 ♂♂ 9 ♀♀ (INPA), Rio Mapuera, margem esquerda do Igarapé Beiradão, 19.vi.1986, V. Py-Daniel & U. Barbosa coll. **Minas Gerais:** 1 ♀ (DPIC), Luz, Ribeirão Jorge Grande, 19°40′13″S/ 45°36′37″W, 20.ii.2010, H.D.D. Rodrigues coll.; 7 ♂♂ 4 ♀♀ (DPIC), same data of the previous locality, except 13.iii.2010, H.D.D. Rodrigues & G.J.C. Vianna coll. [same material examined by Rodrigues et al. (2012)]. **São Paulo:** 1 ♂ (MZSP), Marília, 22°16′S/ 49°56′W, 650 m a.s.l., v.1947, F. Plaumann coll.; 1 ♂ 3 ♀♀ (MZSP), Pirassununga, 28.ii.1940, Schubart coll. [same material examined by Moreira & Barbosa (2011)].

Dimensions. ***Macropterous male*** (n = 5; mm). BL 3.05–3.20; HL 0.45–0.47; HW 0.57–0.62; ANT I 0.45–0.50, ANT II 0.37, ANT III 0.23–0.25, ANT IV 0.33–0.35; EYE 0.15–0.17; PL 1.12–1.17; PW 1.07–1.12; FORE LEG: FEM 0.70–0.75, TIB 0.72–0.75, TAR I 0.06, TAR II 0.07, TAR III 0.27–0.28; MID LEG: FEM 0.82–0.92, TIB 0.97, TAR I 0.07–0.08, TAR II 0.10–0.11, TAR III 0.32–0.35; HIND LEG: FEM 0.95–0.97, TIB 1.25–1.27, TAR I 0.07–0.08, TAR II 0.15, TAR III 0.35–0.37.

Macropterous female (n = 5; mm). BL 3.65–3.75; HL 0.60–0.61; HW 0.63–0.65; ANT I 0.57–0.58, ANT II 0.47–0.49, ANT III 0.26–0.30, ANT IV 0.33–0.37; EYE 0.15–0.17; PL 1.30–1.32; PW 1.20–1.22; FORE LEG: FEM 0.80–0.86, TIB 0.80–0.85, TAR I 0.06, TAR II 0.07, TAR III 0.33–0.34; MID LEG: FEM 1.00–1.02, TIB 1.12–1.13, TAR I 0.07, TAR II 0.12, TAR III 0.37–0.40; HIND LEG: FEM 1.15–1.27, TIB 1.47–1.50, TAR I 0.08, TAR II 0.17–0.20, TAR III 0.40–0.45.

Diagnostic characters. Head dark brown to black, except for orange brown posterior region and inner margin of the eyes. Pronotum orange brown, with only a pair of small lateral whit-



Figs 26–28. *Oiovelia cunucunumana* Drake & Maldonado-Capriles, 1952, dorsal view: 26–27 – macropterous female; 28 – macropterous male. Scale bars = 1 mm.

ish pruinose areas between the anterior and posterior lobes. Fore wings reaching the genital segments dark brown, with a pair of whitish to yellow elongated maculae at the base, starting from humeri and surpassing the apex of pronotum; entirely covered by a faint uniform whitish pruinosity, which can be absent below the basal maculae (Fig. 28). Coxae and trochanters yellowish; femora and tibiae dark brown to black. Proctiger of male without elevation or spines (Fig. 40); paramere tapering slightly in middle, with rounded apex and setae on the dorsal and ventral surfaces (Fig. 72).

Intraspecific variation. Within the same population, the color of head and pronotum varied significantly from orange brown, typical of this species, to dark brown (Figs 26–27). In some cases the difference of color dorsally on the head is not evident.

Differential diagnosis. This species is known only in the macropterous form and has *O. rivicola* as a morphologically similar species. Both are distinguished by the V-shaped pruinosity on the posterior lobe of pronotum, which is absent in *O. cunucunumana* and present in *O. rivicola*, and by the shape of paramere, widening distinctly in the posterior half of the dorsal surface with subtruncate apex in *O. rivicola*, whereas in *O. cunucunumana* it is not distinctly wide on dorsal surface, with rounded apex. Also, both sexes of the species are differentiated by the length and shape of the antennomere IV, smaller (0.33–0.37 mm) and wider in *O. cunucunumana* (Figs 26–28), and longer (0.42–0.48 mm) and more slender in *O. rivicola* (Figs 29–31).

Distribution and habitat. Venezuela (Drake & Maldonado-Capriles 1952, Drake & Roze 1955), Brazil [Amapá (Rodrigues et al. 2012), Amazonas (Rodrigues et al. 2012), Pará (present study), Minas Gerais (Rodrigues et al. 2012), São Paulo (Moreira & Barbosa 2011; present study) and Santa Catarina (Spangler 1986)], Peru (Spangler 1986), Paraguay (Drake & Roze 1955) and Argentina (Mazzucconi & Bachmann 1997a).

At the moment, *O. cunucunumana* is the species of the genus that has the largest occurrence area, recorded from Venezuela to Argentina. In collections recently made in the state of Amazonas, northern Brazil, it was frequently collected together with *O. rivicola* in the same foam masses.

Oiovelia rivicola Spangler, 1986

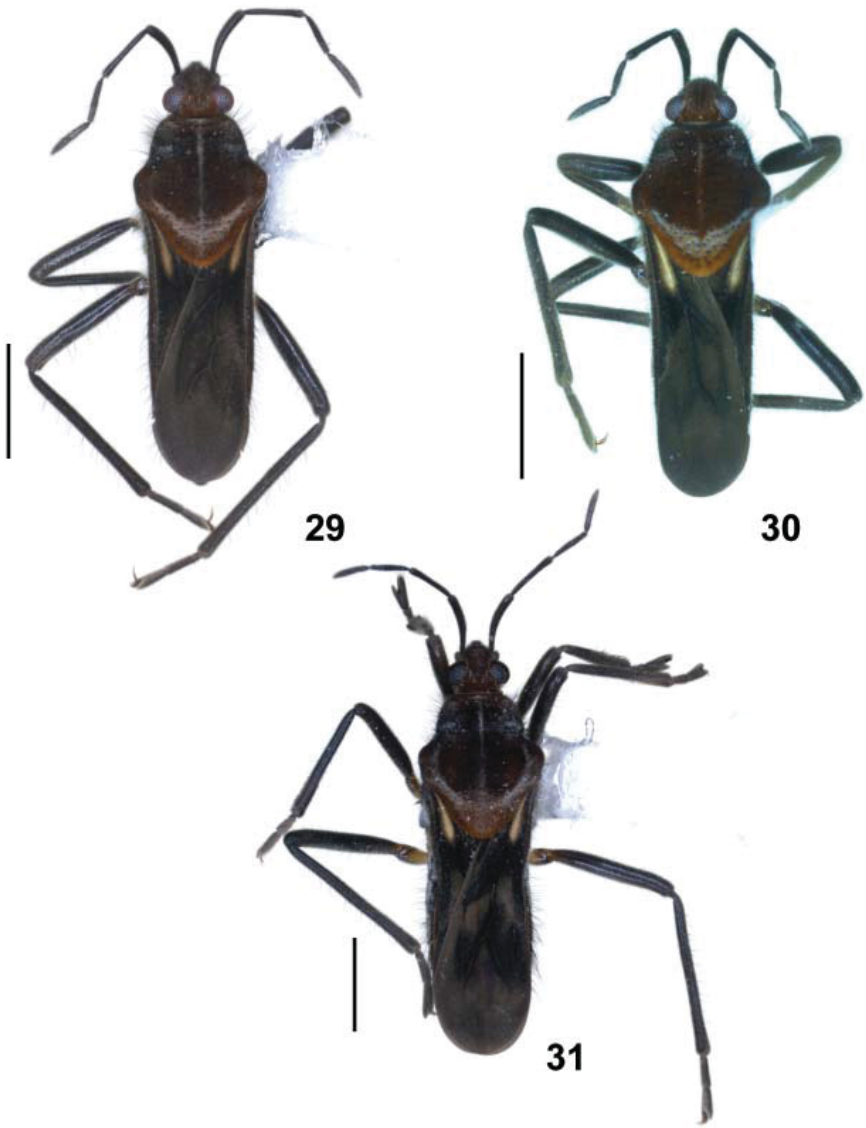
(Figs 29–31, 41–43, 73)

Oiovelia rivicola Spangler, 1986: 446 (original description).

Type locality. Venezuela, Amazonas, Cerro de la Neblina.

Material examined. All specimens macropterous. **BRAZIL: Amapá:** 1 ♂ (INPA), Serra do Navio, Rio Cachaço, Cachoeira do Fernando, 00°53′18.8″N/ 52°01′22.9″W, 02.viii.2011, A.M.O. Pes, P.V. Cruz & A.S. Fernandes coll. **Amazonas:** 1 ♂ (DPIC), Presidente Figueiredo, BR-174, Km 110, Rio Urubuí, 02º01′05″S/ 60º02′04″W, 10.x.2002, D.L.V. Pereira coll.; 2 ♂♂ (DPIC), same data of the previous locality, except Igarapé Camarão, 01º01′05″S/ 60º02′02″W; 6 ♂♂ (DPIC), same data, except Km 107, Cachoeira Santa Cláudia, 02º02′17″S/ 60º00′55″W; 5 ♂♂ 1 ♀ (INPA), Presidente Figueiredo, BR-174, Km 115, Igarapé das Lajes, 01°59′S/ 60°01′W, 01.vii.2011, H.D.D. Rodrigues coll.; 1 ♂ 1 ♀ (DPIC), Presidente Figueiredo, AM-240, Km 12, Reserva Ecológica Cachoeira do Santuário, 02°03′43″S/ 59°55′44″W, 15.x.2002, D.L.V. Pereira coll.; 52 ♂♂ 35 ♀♀ (INPA), same data of the previous locality, except 30.vi.2011, H.D.D. Rodrigues coll.; 17 ♂♂ 8 ♀♀ (INPA), 2 ♂♂ 2 ♀♀ (NMPC), Presidente Figueiredo, AM-240, Km 13, Cachoeira da Porteira, 02°02′15″S/ 59°54′53″W, 30.vi.2011, H.D.D. Rodrigues coll.; 19 ♂♂ 14 ♀♀ (INPA), Presidente Figueiredo, AM-240, Km 20, Igarapé da Onça, Balneário Sossego da Pantera, 02°02′34″S/ 59°51′08″W, 29.vi.2011, H.D.D. Rodrigues coll.; 8 ♂♂ 1 ♀ (INPA), Presidente Figueiredo, AM-240, Km 20, Sítio Santo Amaro, 02°04′05″S/ 59°54′28,8″W, 18.viii.2011, H.D.D. Rodrigues coll.; 2 ♂♂ 2 ♀♀ (DPIC), same data, except Balneário Água Viva, Km 12, 02º03′11″S/ 59º55′24″W, 15.x.2002, D.L.V. Pereira coll.; 41 ♂♂ 24 ♀♀ 24 nymphs (INPA), São Gabriel da Cachoeira, Igarapé Miuá, 00°06′14.2″S/ 66°52′31.3″W, 24.viii.2011, R.L. Ferreira-Keppler, P.V. Cruz, A.S. Fernandes & E.A. Reis coll.; 11 ♂♂ 16 ♀♀ (INPA), Apuí, 06°51′35″S/ 59°58′32″W, 03.v.1999, N. Hamada coll.

Dimensions. ***Macropterous male*** (n = 5; mm). BL 3.55–3.57; HL 0.51–0.55; HW 0.60–0.62; ANT I 0.55–0.57, ANT II 0.50–0.52, ANT III 0.37–0.38, ANT IV 0.45–0.47; EYE 0.15–0.17;



Figs 29–31. *Oiovelia rivicola* Spangler, 1986, dorsal view: 29–30 – macropterous male; 31 – macropterous female. Scale bars = 1 mm.

PL 1.20–1.25; PW 1.12–1.17; FORE LEG: FEM 0.85, TIB 0.85–0.86, TAR I 0.06, TAR II 0.07, TAR III 0.31–0.32; MID LEG: FEM 1.02–1.03, TIB 1.12–1.15, TAR I 0.07, TAR II 0.15–0.16, TAR III 0.32–0.35; HIND LEG: FEM 1.15–1.17, TIB 1.45–1.50, TAR I 0.07–0.08, TAR II 0.22–0.26, TAR III 0.33–0.35.

Macropterous female (n = 5; mm). BL 3.90–4.12; HL 0.55; HW 0.65; ANT I 0.60–0.62, ANT II 0.52–0.55, ANT III 0.33–0.40, ANT IV 0.42–0.48; EYE 0.17–0.18; PL 1.40–1.42;

PW 1.25–1.27; FORE LEG: FEM 0.92–0.95, TIB 0.92–0.94, TAR I 0.06, TAR II 0.07–0.08, TAR III 0.35; MID LEG: FEM 1.05–1.20, TIB 1.15–1.25, TAR I 0.07, TAR II 0.15–0.18, TAR III 0.37; HIND LEG: FEM 1.30–1.45, TIB 1.47–.167, TAR I 0.07–0.08, TAR II 0.25, TAR III 0.37–0.40.

Diagnostic characters. Head and pronotum reddish brown, except for the orange margins of the posterior lobe of pronotum. A pair of small areas of whitish pruinosity laterally on the anterior lobe and another more evident V-shaped area on the posterior lobe. Fore wings reaching the genital segments, with a faint uniform whitish pruinosity covering almost the entire wing and a pair of elongated pale yellow maculae at the base, starting from humeri and surpassing the apex of pronotum (Figs 29–31). Coxae and trochanters yellowish; femora and tibiae dark brown to black. Proctiger of the male without elevation or spines (Fig. 43). Paramere narrow medially, widening distinctly in posterior half of the dorsal surface, with subtruncate apex (Fig. 73).

Differential diagnosis. This species is known only in the macropterous form and is morphologically similar to *O. cunucunumana*; both species were collected in the same mass of foam. However, *O. rivicola* has a V-shaped pruinose area on posterior lobe of pronotum and posterior half of the paramere distinctly widened, subtruncate, whereas in *O. cunucunumana* the pruinosity is absent and the paramere is not distinctly widened posteriorly, having more setae along its margins. Also, both sexes are differentiated by the length of the antennomere IV, smaller (0.33–0.37 mm) and wider in *O. cunucunumana*, and longer (0.42–0.48 mm) and slender in *O. rivicola*. It differs from the others species which also have a V-shaped pruinosity on the posterior lobe of pronotum (*Oiovelia chenae* sp. nov., *O. hamadae* sp. nov. and *O. pydanieli* sp. nov.) in the fore wings without well-defined pruinose areas between the cells, which occur on the other three species.

Distribution and habitat. Venezuela (Spangler 1986) and Brazil: Amapá and Amazonas (present study). The first record for Brazil.

Spangler (1986) mentioned that all specimens examined in his study were collected by an ultraviolet light trap on the banks of the Baria river in a non-elevated region (140 m a.s.l.) in southern Venezuela. The author also assumed that its habitat would be possibly streams. Recently, specimens of *O. rivicola* were collected in foam masses formed in black water streams, both on the surface and in galleries formed within these.

Oiovelia spumicola Spangler, 1986

(Figs 32–34, 44–46)

Oiovelia spumicola Spangler, 1986: 438 (original description).
Oiovelia spumicola: Mazzucconi & Bachmann (1997b): 68 (notes on immature stages).

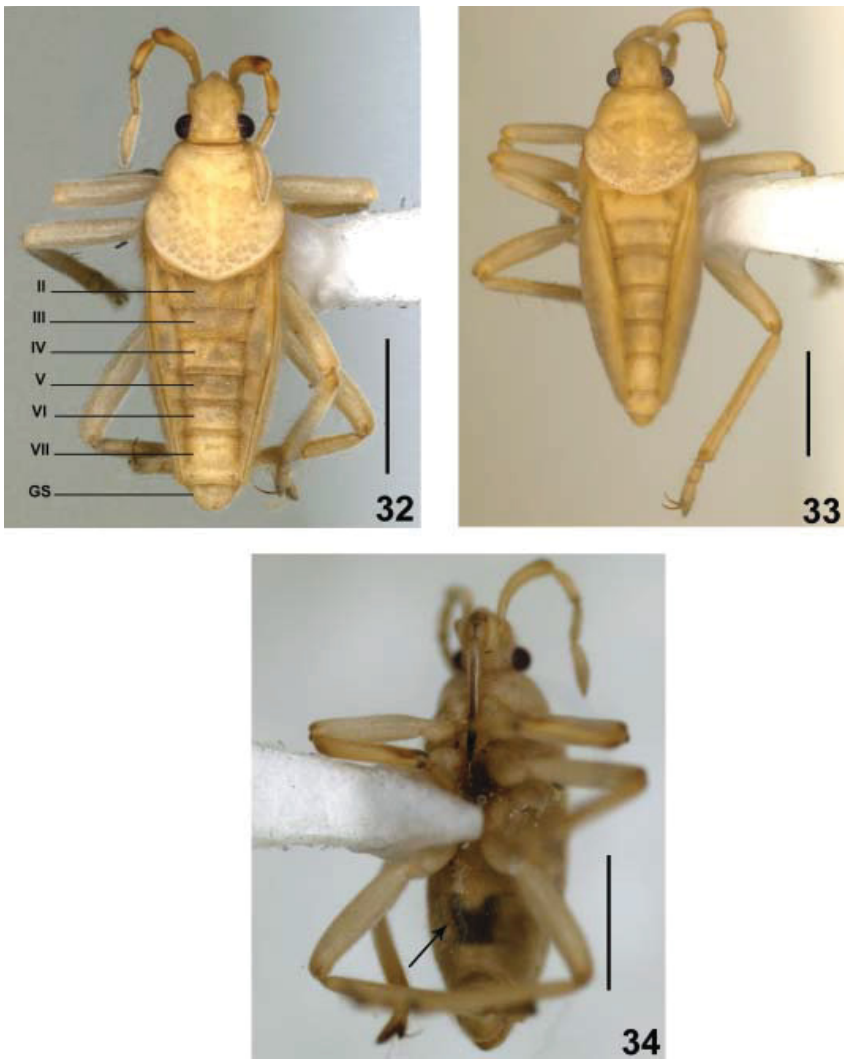
Type locality. Venezuela, Amazonas, Cerro de la Neblina.

Type material examined. Paratypes: **VENEZUELA: Território Federal Amazonas:** 1 ♂ 1 ♀ (apt) (INPA), 1 ♀ (apt) (MZSP), Cerro de la Neblina, 1450 m a.s.l., 00º52′N/ 65º58′W, 25–28.ii.1985, P.J. Spangler, P.M. Spangler & R.A. Faitoute coll.

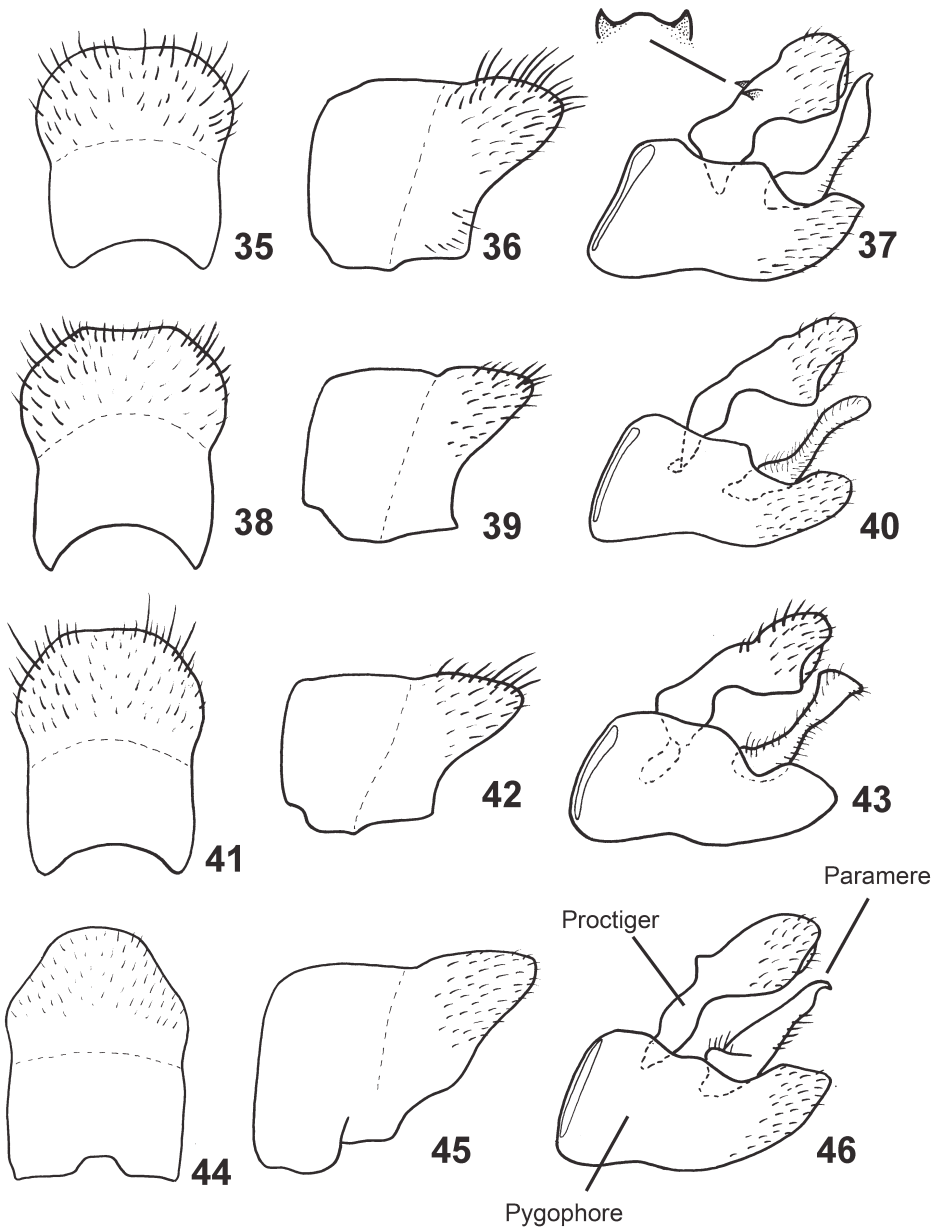
Dimensions. ***Apterous male*** (n = 1; mm). BL 3.10; HL 0.50; HW 0.60; ANT I 0.62, ANT II 0.33, ANT III 0.27, ANT IV 0.40; EYE 0.12; PL 0.97; PW 1.05; FORE LEG: FEM 0.85, TIB 0.83, TAR I 0.06, TAR II 0.06, TAR III 0.35; MID LEG: FEM 0.92, TIB 0.97, TAR I 0.06, TAR II 0.10, TAR III 0.40; HIND LEG: FEM 1.15, TIB 1.30, TAR I 0.07, TAR II 0.10, TAR III 0.40.

Apterous female (n = 1; mm). BL 3.55; HL 0.55; HW 0.62; ANT I 0.60, ANT II 0.30, ANT III 0.26, ANT IV 0.43; EYE 0.13; PL 0.97; PW 1.05; FORE LEG: FEM 0.92, TIB 0.83, TAR I 0.06, TAR II 0.06, TAR III 0.37; MID LEG: FEM 1.05, TIB 1.06, TAR I 0.09, TAR II 0.11, TAR III 0.38; HIND LEG: FEM 1.22, TIB 1.32, TAR I 0.07, TAR II 0.15, TAR III 0.41.

Diagnostic characters. This species is easily identified and differentiated from all other species by the yellowish general color of the body and appendages (Figs 32–34). Also, the



Figs 32–34. *Oiovelia spumicola* Spangler, 1986. 32–33 – dorsal view: 32 – apterous male; 33 – apterous female; 34 – ventral view of apterous male (arrow indicates the dark area on sternites V–VI). Abdominal tergites as roman numerals, GS – genital segments. Scale bars = 1 mm.



Figs 35–46. Genital segments of male. 35, 38, 41, 44 – dorsal view of genital segment I; 36, 39, 42, 45 – lateral view of genital segment I; 37, 40, 43, 46 – lateral aspect of genital capsule. 35–37 – *Oiovelia brasiliensis* Moreira, Nessimian & Rúdio, 2010; 38–40 – *O. cunucunumana* Drake & Maldonado-Capriles, 1952; 41–43 – *O. rivicola* Spangler, 1986. 44–46 – *O. spumicola* Spangler, 1986.

male has dark central areas on sternites V–VI (Fig. 34), proctiger with a small acute process on the dorsal surface, and paramere broad at base, tapering to apex, which is hook-shaped (Fig. 46).

Differential diagnosis. The apterous and macropterous forms are known in both sexes. However, it was not possible to examine macropterous specimens in this study. Spangler (1986) mentions that their form is similar to apterous specimens, differing from the last mainly in dark brown color of the dorsal surface of head, sides of thorax and abdominal sternites. In addition, the pronotum is reddish brown in anterior third and the fore wings are dark brown, with a basal creamy yellow area.

Distribution and habitat. Venezuela (Spangler 1986).

This species is known only from the type locality, Tepui Cerro de la Neblina, on the border of Venezuela and Brazil. It may possibly be an endemic species of this geographical region. All specimens were collected on foam masses formed in black water streams above 1450 m a.s.l. (Spangler 1986).

Descriptions of the new species

Oiovelia chenae Rodrigues & Melo sp. nov.

(Figs 47–49, 59–61, 74, 78)

Type locality. Brazil, Pará, Alter do Chão.

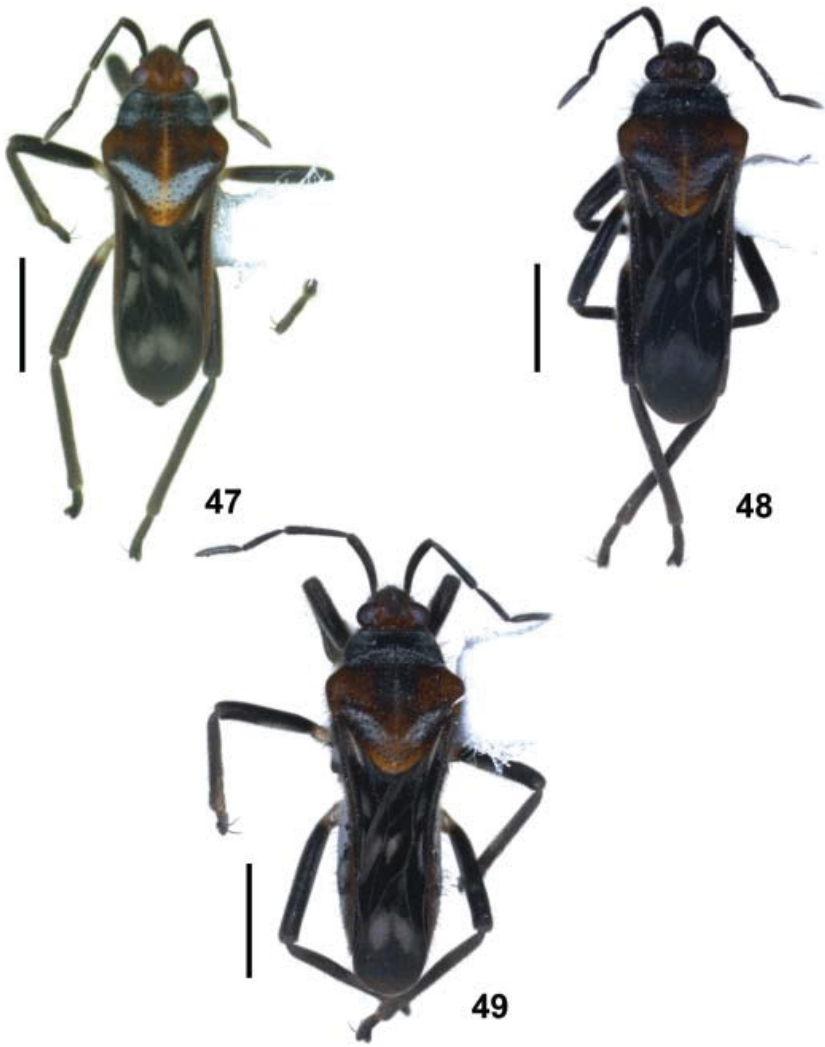
Type material. All specimens macropterous. Holotype: ♂ (INPA), **BRAZIL: Pará:** Alter do Chão, 10 km towards Santarém, Igarapé Jutuaranã, on foam masses, 30 m a.s.l., 02°32′04.5″S/ 54°54′33.0″W, 01.x.2012, A.S. Fernandes coll. Paratypes: 36 ♂♂ 30 ♀♀ (INPA), 3 ♂♂ 3 ♀♀ (DPIC), 3 ♂♂ 3 ♀♀ (MZSP), same data of holotype.

Additional material examined. All specimens macropterous. **BRAZIL: Pará:** 9 ♂♂ 14 ♀♀ 35 nymphs (INPA), Rio Mapuera, Igarapé da Tentativa, 08.vi.1986, V. Py-Daniel & U. Barbosa coll. **Amazonas**: 18 ♂♂ 15 ♀♀ (INPA), 2 ♂♂ 2 ♀♀ (NMPC), São Gabriel da Cachoeira, BR-304, Km 19, in foams, 00°02′58.4″S/ 66°57′47.1″W, 27.viii.2011, R.L. Ferreira-Keppler, P.V. Cruz, A.S. Fernandes & E.A. Reis coll.; 1 ♂ (DPIC), Presidente Figueiredo, BR-174, Km 110, Igarapé Camarão, 01º01′05″S/ 60º02′02″W, 10.x.2002, D.L.V. Pereira coll.; 6 ♀♀ (INPA), Rio Preto da Eva, Rio Urubu, 02°34′49.58″S/ 59°26′22.2″W, no more data.

Dimensions. ***Macropterous male*** (n = 5; mm). BL 3.02–3.25; HL 0.43–0.55; HW 0.57–0.60; ANT I 0.52–0.56, ANT II 0.47–0.50, ANT III 0.33–0.35, ANT IV 0.38–0.40; EYE 0.16–0.17; PL 1.12–1.18; PW 1.05–1.12; FORE LEG: FEM 0.75–0.81, TIB 0.75–0.80, TAR I 0.06, TAR II 0.07, TAR III 0.28–0.30; MID LEG: FEM 0.95–1.02, TIB 1.00–1.12, TAR I 0.07, TAR II 0.17–0.18, TAR III 0.31–0.32; HIND LEG: FEM 1.12–1.25, TIB 1.37–1.40, TAR I 0.07–0.08, TAR II 0.25, TAR III 0.35–0.37.

Macropterous female (n = 5; mm). BL 3.55–3.60; HL 0.47–0.50; HW 0.65; ANT I 0.57, ANT II 0.50–0.53, ANT III 0.33–0.35, ANT IV 0.40–0.42; EYE 0.17–0.18; PL 1.32–1.35; PW 1.22–1.23; FORE LEG: FEM 0.85–0.87, TIB 0.86–0.87, TAR I 0.06, TAR II 0.08, TAR III 0.32–0.33; MID LEG: FEM 1.05–1.07, TIB 1.13–1.15, TAR I 0.07, TAR II 0.17–0.21, TAR III 0.36–0.37; HIND LEG: FEM 1.25–1.26, TIB 1.50–1.52, TAR I 0.07, TAR II 0.25–0.27, TAR III 0.37–0.38.

Description. ***Macropterous male.*** *Color.* Head orange brown, with ventral region brownish. Antennae dark brown to black. Eyes dark brown to black. Rostrum with segments I–II brownish; segment III dark brown along midline, laterally yellowish; segment IV black. Pronotum brownish, with anterior lobe and parts of margins of posterior lobe darker; midline and a



Figs 47–49. *Oiovelia chenae* sp. nov., dorsal view: 47 – macropterous male holotype; 48 – macropterous male (from São Gabriel da Cachoeira); 49 – macropterous female (from São Gabriel da Cachoeira). Scale bars = 1 mm.

small region near the posterior angle yellowish brown. Fore wings blackish, with well defined whitish pruinose areas between cells; veins lighter, and a pair of narrow white maculae starting from humeri and ending near apex of pronotum (Fig. 47). Propleura dark brown to black, with posterior region below humeral angle orange brown; meso- and metapleura dark brown to black (Fig. 78). Coxae, trochanters and a narrow basal area of femora yellowish, remaining parts dark brown to black. Prosternum dark brown, with anterior margin orange brown; meso- and metasternum dark brown. Connexiva brown to orange brown. Abdominal

segments ventrally dark brown in the region of spiracles, and brown to dark brown on sternites. Genital segments brownish.

Structural characters. Head covered by fine golden pubescence and long dark setae concentrated dorsally. Antenniferous tubercles swollen and shiny. Antennae covered by golden pubescence, with long dark setae scattered on antennomeres III–IV; antennomere I robust, curved outward; II slightly more robust than III and longer; antennomere IV slightly longer than III, fusiform. Pronotum covered by golden pubescence and long dark setae concentrated on anterior lobe and posterior margin; a pair of whitish pruinose areas laterally between anterior and posterior lobes; another V-shaped pruinose area more evident on posterior lobe, not reaching the margins (Fig. 47); longitudinal midline weakly carinate, more evident between humeral angles. Pleurae with pruinose areas; propleura with irregular row of small rounded punctations on posterior portion; mesopleura anteriorly with row of same punctations; metapleura with whitish setae posteriorly. Legs covered by golden pubescence, with scattered long dark setae. Protibia slightly flattened distally, with grasping comb on distal two thirds. Pruinose areas laterally on abdominal segments III–V. Connexiva not elevated, covered by golden pubescence and long dark brown setae. Body ventrally covered by whitish pubescence. Genital segment I with anterior margin excavated ventrally; posterior region with long dark setae dorsally; dorsal posterior margin slightly concave medially (Figs 59–60). Proctiger with a slight depression on apical third, without expansions, projections or spines (Fig. 61). Paramere elongated, slightly tapering to apex, which is rounded (Fig. 74).

Macropterous female. Similar in color and morphology to macropterous male (Fig. 49), except for the more elevated connexiva and whitish pruinose areas on lateral margins of abdominal segments II–VI and a small area above spiracles on segments III and V–VII.

Intraspecific variation. Substantial variation was observed in body color and pruinose areas of the pronotum. Specimens from São Gabriel da Cachoeira have darker bodies, with pruinose area of the posterior lobe of pronotum weaker and medially divided by the longitudinal carina (Figs 48–49), whereas the specimens from Alter do Chão are lighter, with the longitudinal yellowish strip and pruinose area of the posterior lobe more evident (Fig. 47).

Differential diagnosis. This species is known only in the macropterous form. It is morphologically similar to *Oiovelia hamadae* sp. nov., mainly in color and pruinosity. The pro- and mesopleura are dark brown to blackish in *O. chenae* sp. nov., whereas in *O. hamadae* the dorsal half is orange brown and ventral half is dark brown. However, due to the color variation in populations of both species, it is recommended to compare the males, because females are very similar. Male paramere of *O. chenae* slightly tapers to the apex, and in *O. hamadae* it slightly tapers in the middle, widening to the apex, which is wider and more rounded. In addition, the paramere of *O. pydanieli* sp. nov. is very similar in shape and pilosity to *O. chenae*, but both species are differentiated by the color of the pronotum, which has the anterior lobe dark brown to blackish and the posterior lobe reddish brown to brownish, with a smaller yellowish area medially in the posterior angle in *O. chenae*, being uniform orange to orange brown in *O. pydanaieli*. Also, the male proctiger of *O. chenae* has a small depression on the dorsal surface, absent in *O. pydanieli*.

Etymology. Named in honor of Dr. Ping-ping Chen (Netherlands Biodiversity Centre, Leiden), in recognition of her valuable contributions to the taxonomy of aquatic Heteroptera.

Distribution and habitat. Brazil (Amazonas and Pará).

The type series was collected on foam masses formed in a stream of transparent water on the Tapajós River Basin. It is also recorded from the Trombetas River Basin, above the Oriximiná municipality (Pará), Negro River Basin, in São Gabriel da Cachoeira, and between Manaus and Rio Preto da Eva municipalities (Amazonas). All these localities are situated in northern Brazil.

Oiovelia hamadae Rodrigues & Melo sp. nov.

(Figs 50–51, 62–64, 75, 79)

Type locality. Brazil, Amazonas, Manaus.

Type material. All specimens macropterous. Holotype: ♂ (INPA), **BRAZIL: Amazonas:** Manaus, Reserva Forestal Adolpho Ducke, Igarapé Acará, on foam masses, 22.vi.2011, H.D.D. Rodrigues coll. Paratypes: 10 ♂♂ 18 ♀♀ (INPA), 3 ♂♂ 3 ♀♀ (DPIC), 3 ♂♂ 3 ♀♀ (MZSP), 2 ♂♂ 4 ♀♀ (NMPC), same data of holotype.

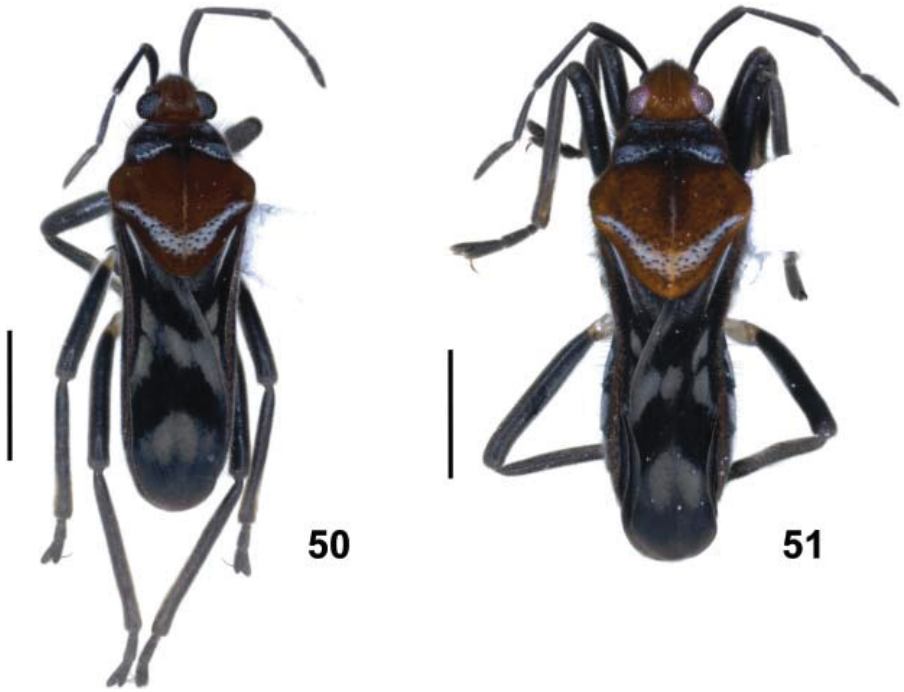
Additional material examined. All specimens macropterous. **BRAZIL: Amazonas:** 1 ♂ (DPIC), Presidente Figueiredo, BR-174, Km 135, Igarapé Canoas, igarapé II do ramal Castanhal, 01º49′51″S/ 60º04′15″W, 10.ix.2002, D.L.V. Pereira coll.; 1 ♀ (DPIC), same data, except igarapé I do ramal do Castanhal, 09.ix.2002, 03º01′45″S/ 60º08′33″W; 2 ♀♀ (DPIC), Presidente Figueiredo, Vivenda Fênix, ramal do Urubuí, Km 9, 02º03′00″S/ 60º06′09″W, 16.x.2002, D.L.V. Pereira coll.

Dimensions. ***Macropterous male*** (n = 5; mm). BL 3.20–3.42; HL 0.45–0.52; HW 0.60–0.64; ANT I 0.55–0.60, ANT II 0.50–0.52, ANT III 0.37–0.39, ANT IV 0.41–0.45; EYE 0.18–0.20; PL 1.17–1.27; PW 1.07–1.20; FORE LEG: FEM 0.80–0.82, TIB 0.80–0.85, TAR I 0.06–0.07, TAR II 0.08–0.10, TAR III 0.31–0.32; MID LEG: FEM 1.03–1.05, TIB 1.10–1.20, TAR I 0.07, TAR II 0.17–0.23, TAR III 0.32–0.35; HIND LEG: FEM 1.12–1.25, TIB 1.37–1.53, TAR I 0.07–0.08, TAR II 0.25–0.27, TAR III 0.35–0.37.

Macropterous female (n = 5; mm). BL 3.50–3.75; HL 0.45–0.55; HW 0.62–0.66; ANT I 0.58–0.64, ANT II 0.52–0.55, ANT III 0.37–0.40, ANT IV 0.45–0.47; EYE 0.18–0.20; PL 1.27–1.35; PW 1.15–1.25; FORE LEG: FEM 0.89–0.92, TIB 0.87–0.92, TAR I 0.07, TAR II 0.10–0.11, TAR III 0.32–0.35; MID LEG: FEM 1.12–1.15, TIB 1.18–1.27, TAR I 0.07–0.09, TAR II 0.22–0.23, TAR III 0.33–0.39; HIND LEG: FEM 1.25–1.32, TIB 1.52–1.62, TAR I 0.08, TAR II 0.27–0.32, TAR III 0.38–0.40.

Description. ***Macropterous male.*** *Color*. Head orange brown, with ventral region brownish. Antennae dark brown. Eyes dark red. Rostrum brown, with dorsal surface and lateral margins of segment III yellowish, segment IV black. Pronotum orange brown, with anterior lobe dark brown. Fore wings blackish, with well defined whitish pruinose areas between cells; veins lighter, and a pair of narrow whitish maculae starting from humeri and ending near apex of pronotum (Fig. 50). Pro- and mesopleura with superior half orange brown, inferior half brownish (Fig. 79). Coxae, trochanters and a narrow basal area of femora yellowish, rest of legs dark brown to black. Prosternum brown to orange brown; meso- and metasternum dark brown. Abdominal segments orange brown near connexiva and blackish in spiracle region; sternites brown to dark brown. Genital segments brownish.

Structural characters. Head covered by fine golden pubescence and long dark setae. Antenniferous tubercles swollen, shiny. Antennae covered by golden pubescence, with long dark setae scattered on antennomeres III–IV; antennomere I robust, curved outward; II slightly more robust than III, longer; antennomere IV slightly longer than III, fusiform. Pronotum



Figs 50–51. *Oiovelia hamadae* sp. nov., dorsal view: 50 – macropterous male holotype; 51 –macropterous female paratype. Scale bars = 1 mm.

covered with golden pubescence, long dark setae laterally concentrated on anterior lobe, and posteriorly on apical margin; a pair of whitish pruinose areas between anterior and posterior lobes; another V-shaped pruinose area more evident on posterior lobe, not reaching its margins (Fig. 50); longitudinal midline weakly carinate, more evident between humeral angles. Pleurae with pruinose areas; pro- and mesopleura with small rounded punctations; metapleura with whitish setae posteriorly. Legs covered by golden pubescence, with scattered long dark setae. Protibia slightly flattened distally, with grasping comb approximately on posterior half. Pruinose areas laterally on abdominal segments IV–VII, and pruinosity of segment IV does not reach the region above spiracles. Connexiva not elevated, covered by golden pubescence and long dark setae. Body ventrally covered by whitish pubescence. Genital segment I with anterior margin excavated ventrally; posterior region with long dark setae dorsally; dorsal posterior margin slightly concave medially (Figs 62–63). Proctiger without expansions, projections or spines (Fig. 64). Paramere elongated, slightly tapering medially, wider and rounded at apex (Fig. 75).

Macropterous female. Similar in color and morphology to macropterous male (Fig. 51), except for the more elevated connexiva and pruinose areas on lateral margins of abdominal segments IV–VII and a small area on segment III.

Differential diagnosis. This species is known only in the macropterous form. The body color and pruinosity are very similar to *O. chenae* sp. nov., which may make the differentiation of the females of both species more difficult. Generally, in *O. hamadae* sp. nov. the dorsal half of the pro- and mesopleura is orange brown, whereas the ventral half is dark brown, and in *O. chenae* the pro- and mesopleura are entirely dark brown to blackish. However, they are easily distinguished by the paramere slightly narrowing towards the apex in *O. chenae*, which does not occur in *O. hamadae*. In the latter species, the paramere is slightly narrow in middle, widening posteriorly, with wider and rounded apex.

Etymology. Named in honor of Dr. Neusa Hamada (Instituto Nacional de Pesquisas da Amazônia, Manaus), in recognition of her contributions to the knowledge of the aquatic insects of Brazil.

Distribution and habitat. Brazil (Amazonas).

The type series of the new species was collected on the foam masses formed on the banks of a black water stream, in a 'terra firme' forest of the Amazonas state, northern Brazil.

Oiovelia pydanieli Rodrigues & Melo sp. nov.

(Figs 52–54, 65–67, 76, 80)

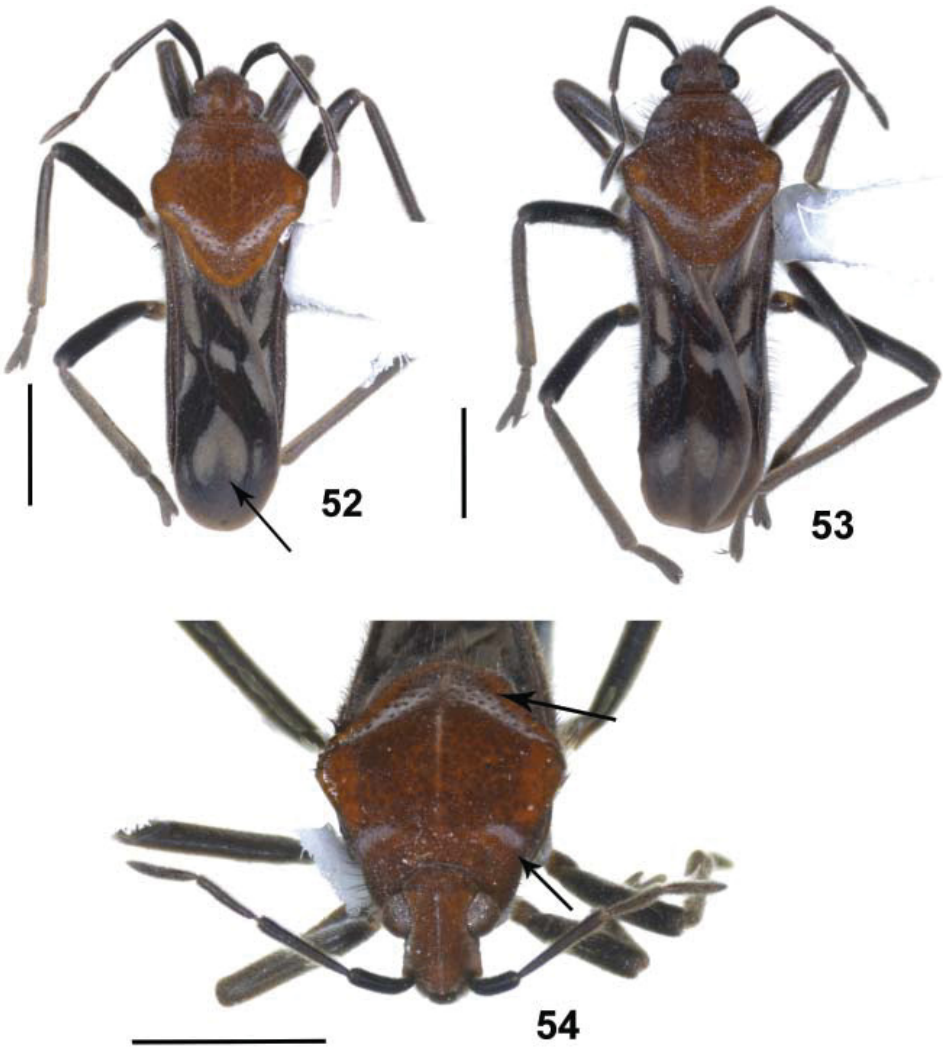
Type locality. Brazil, Roraima, Área Indígena Yanomami, Serra de Surucucu.

Type material. All specimens macropterous. Holotype: ♂ (INPA), **BRAZIL: Roraima:** Área Indígena Yanomami, Serra de Surucucu, 02º49′53″N/ 63º38′19″W, 26.xi.1991, V. Py-Daniel & U. Barbosa coll. Paratypes: 46 ♂♂ 34 ♀♀ (INPA), 3 ♂♂ 3 ♀♀ (DPIC), 3 ♂♂ 3 ♀♀ (MZSP), same data of holotype.

Dimensions. ***Macropterous male*** (n = 5; mm). BL 3.60–3.70; HL 0.50–0.55; HW 0.60–0.62; ANT I 0.60–0.62, ANT II 0.52–0.57, ANT III 0.37–0.38, ANT IV 0.40–0.43; EYE 0.17–0.18; PL 1.35–1.38; PW 1.25; FORE LEG: FEM 0.82–0.87, TIB 0.83–0.90, TAR I 0.07, TAR II 0.08–0.10, TAR III 0.31–0.35; MID LEG: FEM 1.05–1.13, TIB 1.18–1.27, TAR I 0.07. TAR II 0.15–0.16; TAR III 0.36–0.37; HIND LEG: FEM 1.30–1.37, TIB 1.52–1.62, TAR I 0.07–0.08, TAR II 0.20–0.25, TAR III 0.38–0.40.

Macropterous female (n = 5; mm). BL 4.15–4.30; HL 0.50–0.55; HW 0.66–0.70; ANT I 0.62–0.67, ANT II 0.57–0.62, ANT III 0.37–0.38, ANT IV 0.45–0.46; EYE 0.20; PL 1.52–1.56; PW 1.38–1.50; FORE LEG: FEM 1.02–1.05, TIB 0.97–1.06, TAR I 0.06–0.07, TAR II 0.10, TAR III 0.37–0.38; MID LEG: FEM 1.25–1.30, TIB 1.30–1.40, TAR I 0.07, TAR II 0.17–0.20, TAR III 0.42–0.43; HIND LEG: FEM 1.42–1.50, TIB 1.67–1.70, TAR I 0.09–0.10, TAR II 0.24–0.27, TAR III 0.46–0.47.

Description. ***Macropterous male.*** *Color*. Head orange brown, with a small dark brown area below the antenniferous tubercles. Antennae dark brown to black. Eyes dark red. Rostrum brown to dark brown, with the apex of segment III and entire segment IV black. Pronotum orange brown. Fore wings blackish, with well defined whitish pruinose areas between cells, an apical pruinose area shaped as an inverted heart symbol, veins slightly lighter, and a pair of narrow whitish maculae starting from humeri and ending near apex of pronotum (Fig. 52). Pro- and mesopleura orange brown; metapleura orange brown to dark brown (Fig. 80). Prosternum orange brown; meso- and metasternum dark brown. Coxae brown to dark brown; trochanters yellowish to yellowish brown; remaining of leg segments brown to dark brown. Connexiva brown to orange brown. Abdominal segments dark brown to black in spiracle region; sternites brown to dark brown. Genital segments brownish.



Figs 52–54. *Oiovelia pydanieli* sp. nov. 52–53 – dorsal view: 52 – macropterous male holotype (arrow indicates the apical pruinose area); 53 – macropterous female. 54 – frontal view of macropterous female (arrows indicate the pruinose areas). Scale bars = 1 mm.

Structural characters. Head covered by fine golden pubescence and long dark setae concentrated dorsally. Antenniferous tubercles swollen and shiny. Antennae covered by golden pubescence, with long dark setae scattered on apical region of antennomere II and entire segments of III–IV; antennomere I robust, curved outward; II slightly more robust than III, longer; antennomere IV slightly longer than III, fusiform. Pronotum covered by golden pubescence, long dark setae concentrated laterally on anterior lobe and posteriorly on apical

margin, a pair of whitish pruinose areas laterally between anterior and posterior lobes; and another V-shaped pruinose area more evident on posterior lobe, not reaching margins (Figs 52, 54); longitudinal midline weakly carinate, more evident between humeral angles. Pleura with pruinose areas; propleura with a row and other rounded punctations on posterior region; mesopleura anteriorly with a row of some punctations; metapleura with whitish setae posteriorly. Legs covered by golden pubescence, with scattered long dark setae. Protibia slightly flattened distally, with grasping comb approximately on posterior half. Pruinose areas laterally on abdominal segments III–VI, with pruinosity of segments V–VI reaching region above spiracles. Connexiva not elevated, covered by golden pubescence and long dark setae. Body ventrally covered by whitish pubescence. Genital segment I with anterior margin ventrally excavated; posterior region with long dark setae dorsally; dorsal posterior margin slightly concave medially (Figs 65–67). Proctiger without depression, projection or spines (Fig. 67). Paramere elongated, slightly tapering to the rounded apex (Fig. 76).

Macropterous female. Similar in color and morphology to the macropterous male (Fig. 53), except for the more elevated connexiva and pruinose areas on lateral margins of abdominal segments III–VI, the pruinosity of segment III being smaller and in remaining segments reaching region above spiracles.

Intraspecific variation. Some specimens have darker coloration of the pronotum. The basal macula of the fore wing may not be distinct, and the pruinosity on the wing varies slightly in shape and in some cases, the apical pruinose area is not heart-shaped (Fig. 53).

Differential diagnosis. This species is known only in the macropterous form. Its paramere is very similar to *O. chenae* sp. nov. in form and arrangement of the setae. However, these species are distinguished in both sexes by the color of the pronotum, uniformly orange to orange brown in *O. pydanieli* sp. nov., and orange brown to reddish brown with anterior lobe dark brown in *O. chenae*. In addition, male proctiger does not have a slight dorsal depression on the posterior half in *O. pydanieli*, which occurs in *O. chenae*.

Etymology. Named in honor of Dr. Victor Py-Daniel (Instituto Nacional de Pesquisas da Amazônia, Manaus), in recognition of the significant collection of aquatic Heteroptera donated by him to the Invertebrates Collection of the INPA.

Distribution and habitat. Brazil (Roraima).

The type series was collected at Serra de Surucucu, in the western part of the State of Roraima, northern Brazil, situated between 800 and 1000 m a.s.l., but without the information about the habitat of the species on the label.

Oiovelia viannai Rodrigues & Melo sp. nov.

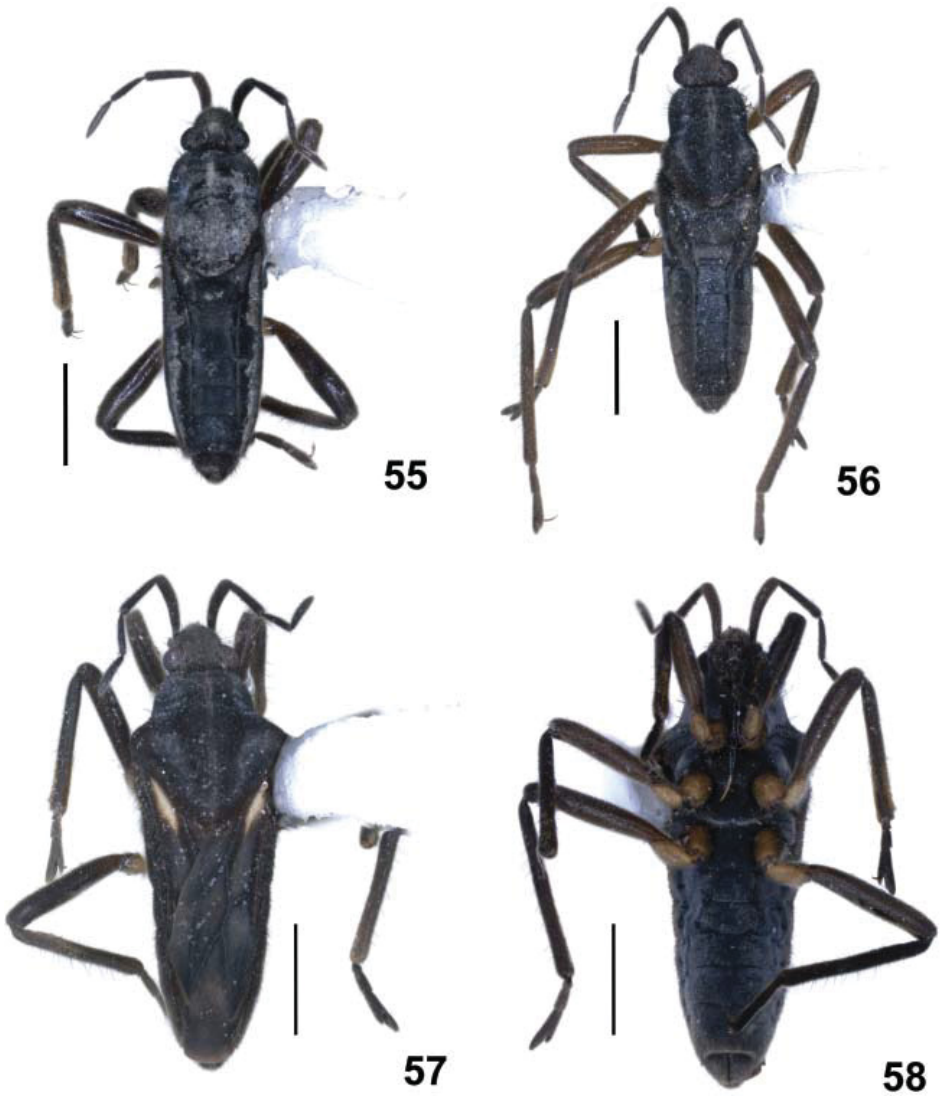
(Figs 55–58, 68–70, 77)

Type locality. Brazil, Minas Gerais, Luz.

Type material. Holotype: ♂ (apt) (MZSP), **BRAZIL: Minas Gerais:** Luz, Ribeirão Jorge Grande, 19º40′13″S/ 45º36′37″W, 27.iv.2010, H.D.D. Rodrigues coll. Paratypes: 2 ♂♂ (apt) 2 ♂♂ (macr) 4 ♀♀ (apt) 1 ♀ (macr) (DPIC), 1 ♂ (macr) 2 ♀♀ (apt) (MZSP), same data of holotype, except 06.i.2010; 2 ♂♂ (apt) 1 ♀ (macr) (MZSP), same data of holotype, except 13.iii.2010, H.D.D. Rodrigues & G.J.C. Vianna coll.

Dimensions. ***Apterous male*** (n = 5; mm). BL 3.55–3.67; HL 0.50–0.56; HW 0.66–0.70; ANT I 0.55–0.58, ANT II 0.48–0.52, ANT III 0.33–0.35, ANT IV 0.40–0.45; EYE 0.15–0.16; PL

1.21–1.33; PW 0.98–1.03; FORE LEG: FEM 0.82–0.90, TIB 0.83–0.91, TAR I 0.06, TAR II 0.06–0.08, TAR III 0.32; MID LEG: FEM 1.05–1.16, TIB 1.16–1.23, TAR I 0.08–0.09, TAR II 0.13–0.15, TAR III 0.36–0.40; HIND LEG: FEM 1.27–1.35, TIB 1.50–1.63, TAR I 0.08–0.09, TAR II 0.20–0.22, TAR III 0.39–0.45.



Figs 55–58. *Oiovelia viannai* sp. nov. 55–57 – dorsal view: 55 – apterous male, holotype; 56 – apterous female, paratype; 57 – macropterous female, paratype. 58 – ventral view of macropterous female, paratype. Scale bars = 1 mm.

Macropterous male (n = 2; mm). BL 3.77–3.87; HL 0.47–0.52; HW 0.65; ANT I 0.55–0.62, ANT II 0.52, ANT III 0.33–0.34, ANT IV 0.41–0.42; EYE 0.16–0.17; PL 1.33–1.36; PW 1.31; FORE LEG: FEM 0.82–0.85, TIB 0.88–0.93, TAR I 0.06, TAR II 0.08, TAR III 0.32; MID LEG: FEM 1.14–1.18, TIB 1.21–1.23, TAR I 0.08, TAR II 0.15, TAR III 0.40; HIND LEG: FEM 1.16–1.30, TIB 1.55–1.60, TAR I 0.08–0.10, TAR II 0.20–0.22, TAR III 0.41–0.42.

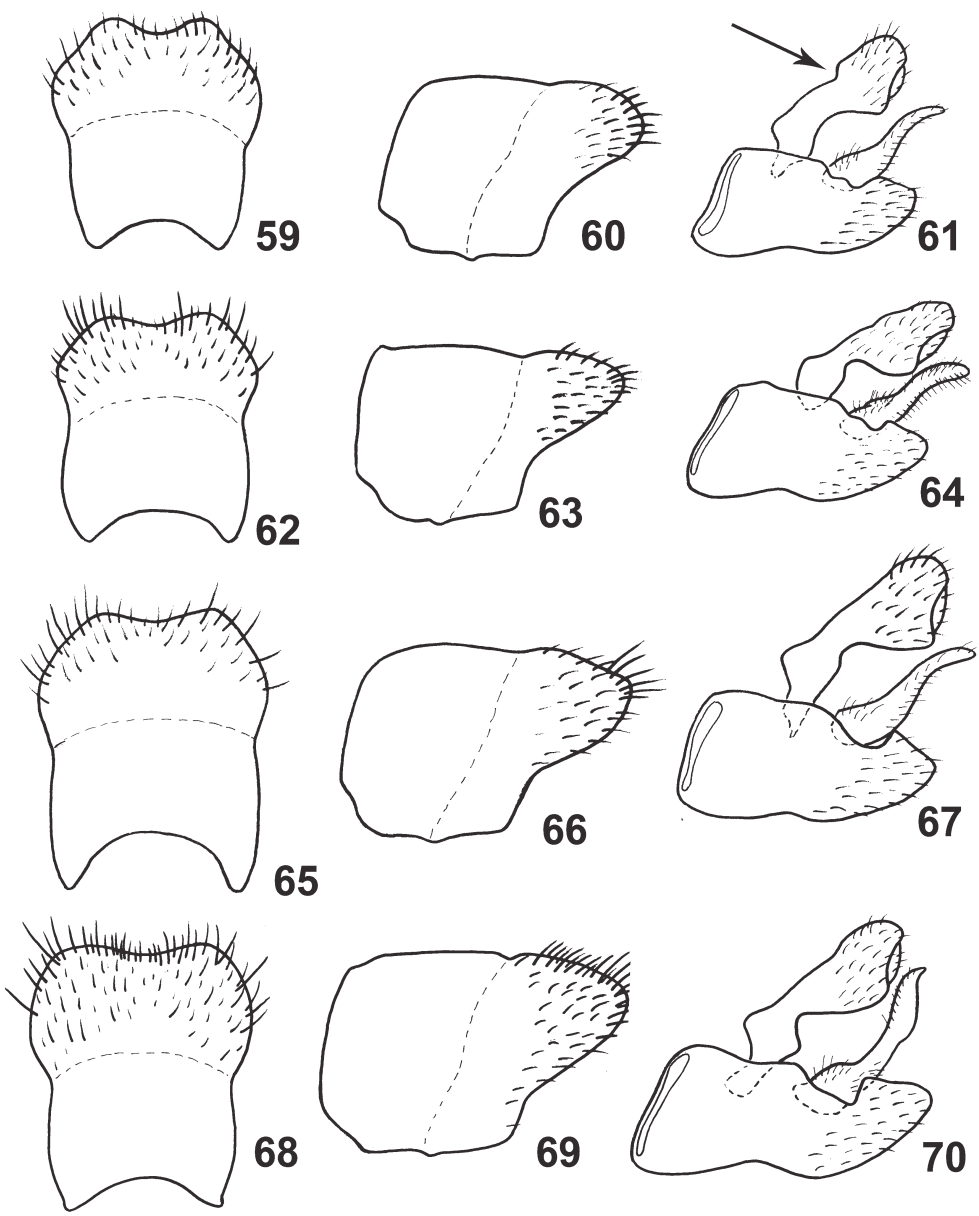
Apterous female (n = 4; mm). BL 3.63–3.85; HL 0.53–0.60; HW 0.62–0.68; ANT I 0.58–0.62, ANT II 0.50–0.56, ANT III 0.34–0.38, ANT IV 0.40–0.45; EYE 0.15–0.17; PL 1.20–1.33; PW 0.95–1.00; FORE LEG: FEM 0.86–0.95, TIB 0.80–0.93, TAR I 0.06, TAR II 0.07, TAR III 0.33–0.36; MID LEG: FEM 1.08–1.12, TIB 1.17–1.25, TAR I 0.07–0.08, TAR II 0.12, TAR III 0.36–0.40; HIND LEG: FEM 1.18–1.33, TIB 1.50–1.63, TAR I 0.08, TAR II 0.17–0.22, TAR III 0.39–0.41.

Macropterous female (n = 3; mm). BL 4.10–4.15; HL 0.50–0.57; HW 0.68–0.70; ANT I 0.57–0.62, ANT II 0.46–0.53, ANT III 0.32–0.37, ANT IV 0.40–0.45; EYE 0.17; PL 1.43–1.50; PW 1.35–1.40; FORE LEG: FEM 0.83–0.90, TIB 0.80–0.86, TAR I 0.06–0.07, TAR II 0.07–0.08, TAR III 0.32–0.35; MID LEG: FEM 1.10, TIB 1.16–1.18, TAR I 0.06–0.09, TAR II 0.10–0.13, TAR III 0.36–0.59; HIND LEG: FEM 1.12–1.28, TIB 1.50–1.56, TAR I 0.08–0.10, TAR II 0.20–0.22, TAR III 0.41–0.43.

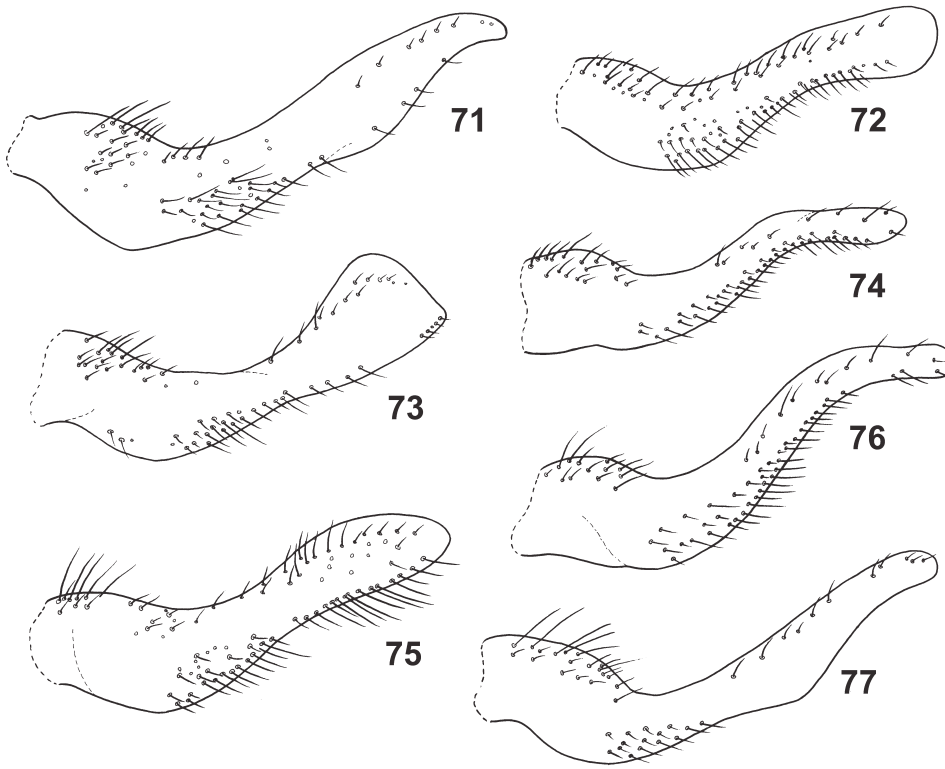
Description. ***Apterous male.*** *Color*. Head dark brown, ventrally almost black. Antennae dark brown. Eyes dark red to dark brown. Rostrum brown, except for black apex of segments III and IV. Pronotum, pleurae, abdominal and genital segments dark brown; midline of pronotum paler. Coxae and trochanters yellowish brown; remaining of segments of legs dark brown (Fig. 55).

Structural characters. Head covered by fine golden pubescence and long dark setae concentrated dorsally in front of eyes. Antenniferous tubercles swollen and shiny. Antennae covered by golden pubescence, with long dark setae scattered on antennomeres II–IV; antennomere I curved outward, widening from base to apex; antennomere II slightly longer and more robust than III; antennomere IV slightly longer than III, fusiform. Pronotum covered by golden pubescence and long dark setae concentrated laterally on anterior lobe, with a slight midline carina; posterior lobe with a faint U-shaped whitish pruinose area. Propleura with two rows of small rounded punctations on posterior portion; mesopleura with a row of same punctations. Legs covered by golden pubescence, with scattered long dark setae. Profemur more robust; protibia with grasping comb on posterior half. Abdomen covered by golden pubescence. Connexiva slightly elevated. Six abdominal tergites visible, converging to the apex in tergite VI (Fig. 55); tergite III with preapical transverse fissure; tergite VII longer, with posterior margin slightly concave. Genital segment I with anterior ventral margin excavated and long dark setae dorsally on posterior region; posterior dorsal margin slightly concave medially (Figs 68–69). Proctiger without elevation or spines (Fig. 70). Paramere narrow, with ventral surface slightly widened in posterior half (Fig. 77).

Macropterous male. Similar to apterous male in color and morphology, except for wider pronotum and more developed humeri which are slightly elevated. Fore wings dark brown, with lighter veins; a pair of yellowish maculae at base, starting from humeri and ending near the apex of pronotum; entirely covered by whitish pruinosity, more evident between cells (Fig. 57).



Figs 59–70. Genital segments of male. 59, 62, 65, 68 – dorsal view of genital segment I. 60, 63, 66, 69 – lateral view of genital segment I. 61, 64, 67, 70 – lateral view of genital capsule. 59–61 – *Oiovelia chenae* sp. nov.; 62–64 – *Oiovelia hamadae* sp. nov.; 65–67 – *Oiovelia pydanieli* sp. nov.; 68–70 – *Oiovelia viannai* sp. nov.



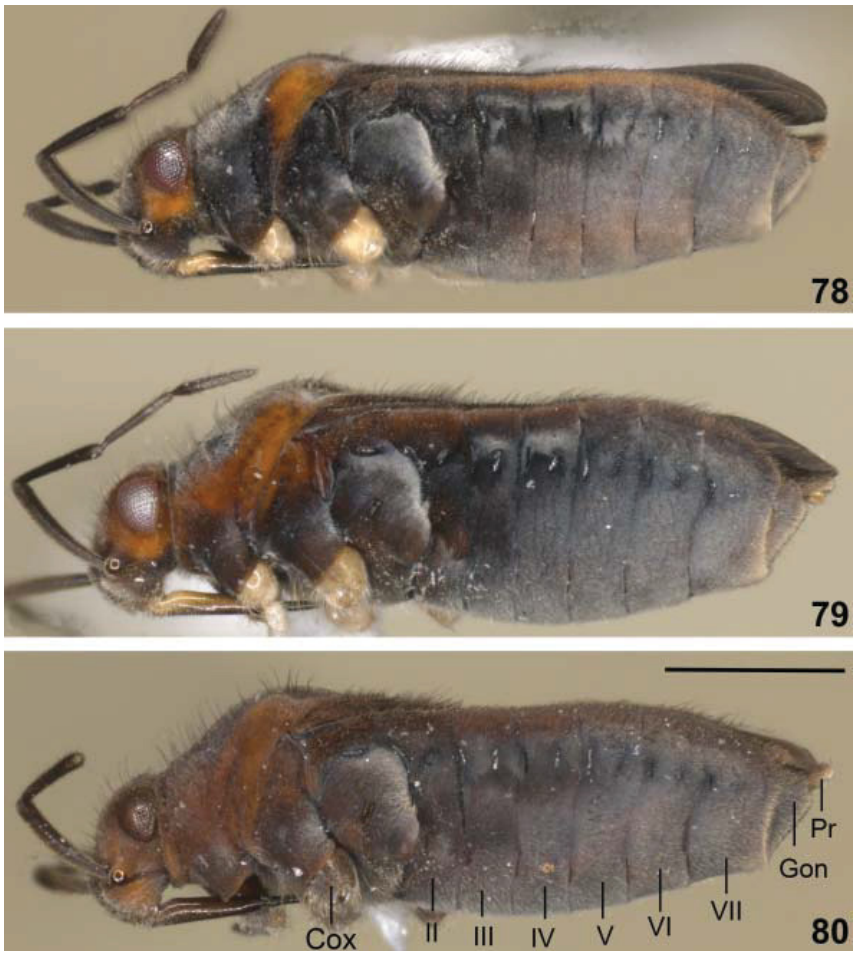
Figs 71–77. Lateral view of the left paramere. 71 – *Oiovelia brasiliensis* Moreira, Nessimian & Rúdio, 2010; 72 – *O. cunucunumana* Drake & Maldonado-Capriles, 1952; 73 – *O. rivicola* Spangler, 1986; 74 – *O. chenae* sp. nov.; 75 – *O. hamadae* sp. nov.; 76 – *O. pydanieli* sp. nov.; 77 – *O. viannai* sp. nov.

Apterous female. Similar to apterous male in color and morphology (Fig. 56), but profemora not dilated; seven abdominal tergites visible; tergite I swollen; tergite II plan and directed downward; the rest of the segments arranged horizontally; connexiva reflected on abdomen, especially in segments III–VI; last abdominal tergite short, with posterior margin slightly concave; long dark setae laterally on abdominal segments II–IV and tergites VI–VII.

Macropterous female. Similar to apterous female in color and morphology (Figs 57–58), except for pronotum and fore wings similar to macropterous male, without long dark setae on lateral margin of abdominal segments II–IV.

Intraspecific variation. Substantial variation was observed only in the intensity of color in the apterous and macropterous forms. The eyes of some specimens have dark red, almost black color. The base of the femur can be yellowish brown; posterior margin of the posterior lobe of pronotum and genital segments can be brown.

Differential diagnosis. This species is known in the apterous and macropterous forms and is morphologically close to *O. brasiliensis* in the similar fore wing and pruinosity, males with profemur slightly dilated and apterous form with the shape of abdominal tergites similar in



Figs 78–80. Lateral view of the macropterous female (legs removed). 78 – *Oiovelia chenae* sp. nov.; 79 – *O. hamadae* sp. nov.; 80 – *O. pydanieli* sp. nov. Abbreviations: Roman numerals – abdominal segments, Gon – gonocoxa, Pr – proctiger. Scale bars = 1 mm.

both sexes. However, *O. viannai* sp. nov. differs from *O. brasiliensis* in the body color dark brown to blackish, with long dark setae only on the lateral margins of the anterior lobe of pronotum and a few of them scattered on the legs, absence of spines on dorsal surface of male proctiger, and in the absence of constriction on abdominal segments III–IV of the female, whereas in *O. brasiliensis* the color is brownish to reddish brown, pronotum, abdomen and legs are more densely covered by dark setae along the margins, and there is a pair of small spines on male proctiger and slight constriction on abdominal segments III–IV of female.

Etymology. The species is named in honor of M.Sc. Gustavo J. C. Vianna for his help in collecting representatives of this species. His friendship helped to motivate H.D.D.R. to persist in his studies concerning this group of insects.

Distribution and habitat. Brazil (Minas Gerais).

Unlike other species of the genus which were collected on foam formed mainly in the banks of lotic environments of black water, the type series of the new species was collected on all occasions in a locality without foam masses, in a brown water stream (due to the mud substrate), with leaves and twigs on the surface and moderate current (Figs 20–21). The specimens were collected only during the rainy season (January–April), when the water level of the stream reached the marginal vegetation.

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