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The genus *Paravelia* Breddin, 1898 (Hemiptera: Heteroptera: Veliidae) in Brazil, with descriptions of eight new species

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The genus *Paravelia* Breddin, 1898 (Hemiptera: Heteroptera: Veliidae) in Brazil, with descriptions of eight new species

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Abstract

Eight new species of *Paravelia* Breddin, 1898 from Brazil are described and illustrated: *P. amapaensis* **sp. nov.** from Amapá State, *P. bipunctata* **sp. nov.** from Minas Gerais, Mato Grosso and Mato Grosso do Sul States, *P. bilobata* **sp. nov.** and *P. polhemusi* **sp. nov.** from Mato Grosso State, *P. bahiana* **sp. nov.** from Bahia State, *P. lacrymosa* **sp. nov.** from Minas Gerais State, *P. micromaculata* **sp. nov.** from Maranhão State, and *P. ornata* **sp. nov.** from Amazonas State. The genus is redescribed, with photos of the dorsal view for nineteen species: *P. basalis* (Spinola), *P. biae* Spangler, *P. boliviana* Breddin, *P. bullialata* Polhemus & Polhemus, *P. capillata* (Drake & Harris), *P. capixaba* Moreira, Nessimian & Rúdio, *P. conata* (Hungerford), *P. dilatata* Polhemus & Polhemus, *P. foveata* Polhemus & Polhemus, *P. itatiayana* (Drake), *P. lanemelo* Moreira & Barbosa, *P. manausana* Polhemus & Polhemus, *P. nieseri* Moreira & Barbosa, *P. platensis* (Berg), *P. recens* (Drake & Harris), *P. rotundantata* (Hungerford), *P. spinifera* Polhemus & Polhemus, *P. splendoris* (Drake & Harris) and *P. williamsi* (Hungerford). Three of these species are recorded for the first time from Brazil: *P. platensis*, *P. spinifera* and *P. williamsi*. Also, the macropterous forms of *P. capixaba* and *P. dilatata* are described. Lastly, an identification key to the 36 species of *Paravelia* recorded from Brazil and a checklist of described species are presented.

Key words: Aquatic insects, Gerromorpha, Neotropical region, taxonomy, Veliinae, water striders

Introduction

The water striders of the genus *Paravelia* Breddin, 1898 (Insecta: Hemiptera: Heteroptera: Gerromorpha: Veliidae) are semiaquatic bugs which occur in a wide variety of lentic and lotic freshwater habitats, and can be found for example among emergent vegetation, on top of large rocks, above fallen logs and roots that penetrate the water, or even on moist terrestrial environments (Mazzucconi *et al.* 2009). Together with the *Microvelia* Westwood, 1834, they are also the only gerromorphan bugs so far found on the pockets of bromeliads (Polhemus & Polhemus 1991). The genus is mainly Neotropical, ranging from Mexico to Argentina (Polhemus 1976; Polhemus & Polhemus 1993). The only exception is *Paravelia taiapiensis* (Cheesman, 1926), described from the Marquesas Islands, eastern Pacific (Andersen 1981).

Forty-nine species have been described in the genus, making it by far the most diverse in the subfamily Veliinae. Twenty-five species are known to occur in Brazil, some of which are known only from the original description (Moreira *et al.* 2010, 2011b; Moreira & Barbosa 2011, 2012). Besides that, many of these descriptions lack illustrations, a fact that makes the prompt recognition of the species difficult. In addition, the taxonomy of the genus has been seriously overlooked, and it is known to be a paraphyletic entity, from which several genera will be removed if a taxonomic revision and a cladistic analysis are made (Polhemus 1976; Andersen 1982).

Based on material collected on four different regions of Brazil (Northern, Northeastern, Central-Western, and Southeastern), eight new species of the genus were discovered and herein described. Also, descriptions of the previously unknown macropterous forms of *P. capixaba* and *P. dilatata* are presented. Material from other localities of Brazil and Peru provided new records, which are presented together with a checklist of the species of the genus and their known geographic distributions (Table 1). Finally, aiming to facilitate the identification of studied species, an identification key to the Brazilian *Paravelia* is provided, and colored photographs of the dorsal habitus of the examined species have been taken. These photographs show the pattern of wing maculae, which is an important characteristic and makes even females identifiable, because apparently there is no sexual dimorphism concerning this feature. If necessary, important characteristics, measurements, and illustrations of male genital capsule were also included.

Material and methods

Studied material consists of alcohol preserved and dry-mounted specimens, from museums and institution collections. In addition, samplings were recently made in some Brazilian states and in one locality from Peru, 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;
CZNX	Zoobotanic Collection James Alexander Ratter, Departamento de Ciências Biológicas, Universidade do Estado do Mato Grosso, Noxa Xavantina, Brazil;
DPIC	Invertebrates Collection, Departamento de Parasitologia, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil;
DZRJ	Entomological Collection Professor José Alfredo Pinheiro Dutra, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil;
INPA	Invertebrates Collection, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil;
MNRJ	Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil;
MZUSP	Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil;
ZUFG	Zoological Collection, Universidade Federal de Goiás, Goiânia, Brazil.

Digital images were obtained with a Leica DFC420 camera attached to a Leica M165C binocular microscope, processed using Leica Application SuiteV3.7.0, and stacked using Auto-Montage. All the localities are organized in north-to-south order. Names of deposition institutes and collectors appear inside parenthesis. On the species checklist, the distribution section for each species is presented at country level, except for Brazil, which is detailed at state level.

All measurements are given in millimeters. Abbreviations used for measurements are 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 foreleg segments (FORELEG), length of midleg segments (MIDLEG), length of hindleg segments (HINDLEG), femoral length (FEM), tibial length (TIB), length of tarsomeres I–III (TAR I, TAR II, TAR III).

Taxonomic treatment

Veliidae Brullé, 1836

Veliinae Brullé, 1836

Genus *Paravelia* Breddin

Paravelia Breddin, 1898: 159–160.

Type-Species: *Velia basalis* Spinola, 1837, by original designation.

The genus *Paravelia* was established by Breddin (1898) to include two species described in the genus *Velia* Latreille, 1804: *V. basalis* Spinola, 1837 and *V. platensis* Berg, 1883, in addition to a new species described by him, *P. boliviana* Breddin, 1898. Most of the other species which are currently included in *Paravelia* were also originally described as *Velia*. Later on, Hungerford (1929a) transferred the species included by Breddin (*P. basalis*, *P. platensis* and *P. boliviana*) in *Paravelia* back to the genus *Velia*, dividing the American *Velia* into the four groups of species: *basalis*, *brachialis*, *inveruglas* and *stagnalis*. In the same year, Hungerford (1929c) created the subgenus *Stridulivelia* Hungerford, 1929 to allocate six species: *Velia cinctipes* Champion, 1898, *V. quadrispinosa* Hungerford, 1929, *V. raspa* Hungerford, 1929, *V. stridulata* Hungerford, 1929, *V. strigosa* Hungerford, 1929 and *V. transversa* Hungerford, 1929.

Thereafter, the genus *Paravelia* was neglected by most researchers, which included all the subsequent new species in the genus *Velia*. After more than forty years, Polhemus (1976) recognized that the *Velia* species from the

New World were not congeneric with those from the Old World, transferring all American species to the genus *Paravelia*, and elevating the subgenus *Stridulivelia* to generic level. Later, Polhemus & Polhemus (1993) recognized two new genera within the species from *Paravelia*, based mainly in sternum and acetabula structures: *Platyvelia* (type *Velia brachialis* Stål, 1860) and *Steinovelina* (type *Velia stagnalis* Burmeister, 1835). Even with reallocations and the creation of new genera, the genus *Paravelia* still seems to be paraphyletic (Polhemus 1976; Andersen 1982; Polhemus & Polhemus 1993).

Redescription. Thoracic polymorphism is very common, with macropterous (as in Fig. 1A), brachypterous (as in Fig. 19A), micropterous (as in Fig. 5A) and apterous (as in Fig. 13D) forms occurring. General body color usually brown, varying from dark, almost black tones, to yellowish or orange, with or without pruinose areas. Body length between 2.30 and 9.00 mm, with or without modified setae similar to minute dark spines, which might be prominent or not, acute or blunt, named in literature as: minute conical black setae, minute peg-like points, black denticles, short black spinules, or flattened triangular tooth; herein considered small black denticles.

Head. Elongated in front of eyes and deflected; dorsally with longitudinal midline impressed and a pair of punctations or impressions on posterior region. Eyes globose, separated by a distance greater than eye width, located on posterior portion of head, adjacent to anterior margin of pronotum. Ocular setae usually present. Rostrum reaching mesocoxa.

Thorax. Pronotum in both apterous and alate forms long, covering meso- and usually almost entire metanotum, with a row of rounded punctations adjacent to anterior margin; posterior lobe covered by the same punctations, with posterior angle varying from rounded (as in Fig. 8A) to triangular (as in Fig. 11A), or acute (as in Fig. 17D); anterior lobe in some species with a pair of maculae (as in Fig. 17A), pruinose areas (as in Fig. 10A) or pubescence (as in Fig. 2A). Apterous and brachypterous forms usually with humeral angles not elevated. Macropterous form with wider pronotum, humeral angles well-developed and slightly elevated; forewings with four closed cells, reaching genital segments and usually dark brown; when closed, generally forming a pair of basal maculae, varying from white to yellowish, near humeral angles of pronotum; normally also another macula on apex of varied shape, which might or not reach the distal end of wings. Pro-, mesopleura, and prosternum with rounded punctations. Intersegmental region between meso- and metasternum generally with two pairs of small tubercles medially. Legs with or without spines; when present usually on hind femur, organized or not in rows, with varying numbers; all legs with three tarsomeres and falcate claws; arolia setae-like; tarsomere I generally very small; tarsomere II of midleg usually very long, reaching to five times the length of tarsomere I in some cases; tarsomere III of all legs cylindrical or subcylindrical, with parallel margins (except for *P. bullialata* and *P. splendoris*, with slightly divergent margins).

Abdomen. Generally without pruinose areas, with posterior angle of last connexival segment developed (as in Fig. 12D) or not (as in Fig. 12E). *Males*—with connexives horizontal to slightly elevated; apterous and brachypterous forms with six visible tergites (as in Figs 14D, 18D); sternite VII sometimes bearing projections (as in Fig. 19D) or small lobes on posterior margin (as in Fig. 6D); proctiger with (as in Figs 20A,D,G) or without projections (as in Figs 20C,F); parameres symmetrical, thin or wide, rich in setae or not. *Females*—with elevated connexives; apterous and brachypterous forms with seven visible tergites (as in Figs 5C, 13D), generally with connexives reflected over abdomen; proctiger and gonocoxae with or without small black denticles.

Discussion. Very similar to the Palearctic genus *Velia* Latreille, 1804 and the South American genus *Oiovelia* Drake & Maldonado-Capriles, 1952. In *Velia* the female proctiger covers the gonocoxae and genital opening; male hind femur bears two widely separated spines on inner surface; and the macropterous form has another median macula, in addition to the basal and apical maculae. In *Paravelia*, the female proctiger does not cover the gonocoxae and genital opening; the spines of male hind femur, if present, are more than two and not widely separated; and the macropterous form usually has only a pair of basal maculae and an apical macula. *Paravelia* differs from *Oiovelia* mainly by the shape of tarsomere III, being cylindrical and with parallel margins, whereas they are expanded and with divergent lateral margins in *Oiovelia*. In addition, the macropterous form in *Paravelia* has a pair of basal maculae, and another apical macula on forewings, whereas in *Oiovelia* the macropterous specimens have only a pair of basal maculae, with remainder of wing at most pruinose. Representatives of *Paravelia* are frequently collected in low numbers, in lentic environments, like temporary pools, slow portions of streams, lakes, or even on water accumulated in bromeliad tanks; whereas the *Oiovelia* species are preferably inhabitants of foam masses formed on streams.

Diagnosis. The genus can be differentiated from other Neotropical Veliinae by the following set of characters

(from Andersen 1982; Polhemus & Polhemus 1993): middle and hind tarsi with setae-shaped arolia, and only two falcate claws; abdominal segments without transverse sulci; hind femora and connexival margin without stridulatory devices; metasternum without lateral tubercles; middle leg with tarsomere II usually 4–5 times longer than the length of tarsomere I, and tarsomere III of all legs subcylindrical, with parallel margins (as in Fig. 1); and macropterous form usually with a basal macula and another apical macula (as in Figs 1A, 2A–B); body length 2.30–9.00 mm.

***Paravelia amapaensis* Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.**

(Figs 1, 3A–B, 21)

Macropterous male. BL 4.80; HL 0.65; HW 0.90; ANT I 0.63, ANT II 0.54, ANT III 0.53, ANT IV 0.61; EYE 0.24; PL 1.64; PW 1.61; FORELEG: FEM 1.10, TIB 1.11, TAR I 0.11, TAR II 0.20, TAR III 0.30; MIDLEG: FEM 1.26, TIB 1.35, TAR I 0.10, TAR II 0.38, TAR III 0.38; HINDLEG: FEM 1.60, TIB 1.70, TAR I 0.14, TAR II lost, TAR III lost.

Head, sides and venter of body orange brown. Antennae brown. Eyes shining black. Bucculae and articles I–II of rostrum light brown; articles III–IV covered by glue. Pronotum centrally brown with orange brown margins. Forewings brown, with distinctly lighter veins; an elongated white macula starting near humeral angle and distinctly surpassing apex of pronotum, and an elongated white macula centrally at apex, strongly constricted at middle (Fig. 1A). Legs brown, with slightly darker areas near apex of femora and tibiae (Figs 1A–B). Genital segments and exposed portion of connexives brown.

Head velvety, with long black setae in front of eyes and adjacent to inner eye margin, and a pair of shining oblique impressions in posterior region, without black denticles. Antennae densely covered by short brown setae and longer black setae, more dense on antennomeres I–II. Antennomere I stoutest, curved outward; II thicker than III–IV; III–IV with subequal width (Fig. 1A). Ocular setae present. Bucculae and gula coarsely punctured.

Pronotum subpentagonal, constricted before middle, covered by short golden setae and longer thin black setae, with weak longitudinal median carina on anterior lobe and punctations on posterior lobe deeper and wider towards apex. Humeri elevated, with outer margin rounded. Posterior angle of pronotum rounded (Fig. 1A). Margins of pronotum thickened after humeri. Forewings reaching base of genital segments, with distinct veins, covered by long setae on outer proximal portions. Sides of thorax (Fig. 1C) and sides and venter of abdomen, except for abdominal sternite VII, densely covered by suboval punctations and by long thin light setae. Venter of thorax not visible. Legs very pilose, with long setae on venter of femora, without spines or spine-like setae (Figs 1A–B). Hind femur distinctly thicker than others. Tibiae slightly flattened near apex. Apex of fore tibiae not visible.

Abdominal connexives densely covered by long, thick setae. Last abdominal sternite centrally flat, with posterior margin truncate (Fig. 1B). Genital segment I with posterior margin forming a small convex lobe medially. Proctiger covered with several setae medially, with a pair of small expansions anteriorly (Figs 3A–B). Parameres elongated, flat, and slightly curved, tapering in apical 1/3, with a row of setae on ventral surface (Fig. 3A).

Type-material. Holotype: Brazil, **Amapá**: macropterous male (MNRJ), Porto Santana, I.C.O.M.I., II–VI.1961, (J.C.M. Carvalho).

Distribution. Only the holotype, collected near the mouth of the Rio Amazonas (Fig. 21) is known up to the present. It is the only species of *Paravelia* recorded from the Amapá State.

Etymology. Named after the Amapá State, northern Brazil, where the holotype was collected.

Discussion. The new species can be distinguished from all other species of the genus by the dense cover of suboval punctations on sides and venter of body, except *P. anta* Mazzucconi, 2000, *P. bilobata* **sp. nov.**, *P. dilatata* Polhemus & Polhemus 1984, *P. foveata* Polhemus & Polhemus, 1984, and *P. hungerfordi* (Drake & Harris, 1933), which also have the same character. *Paravelia amapaensis* **sp. nov.** shares the presence of relatively short white maculae on base of forewings and a strongly constricted white macula on apex (Fig. 1A) with *P. anta*. However, they can be separated by the following characteristics of the former: body shorter than 5.00 mm (5.40–5.70 in *P. anta*), gula and bucculae with about 10 suboval punctures (20 in *P. anta*), pronotum constricted before middle, hind tibia unarmed (30–50 short spines in *P. anta*), and paramere shape.

As for *P. bilobata* **sp. nov.**, the shape of apical macula on forewing (Figs 4A–B), and the presence of a pair of bilobed projections anteriorly on male proctiger (Figs 6E–F), separates this species from *P. amapaensis* **sp. nov.** In

relation to *P. dilatata*, the male of this species has a distinct anterior expansion (Fig. 15B), absent in the new species. In the case of *P. hungerfordi*, the presence of about 35 spines on the hind tibia, the very long basal maculae, and the weakly constricted apical macula of forewings separates it from *P. amapaensis* **sp. nov.** Finally, *P. foveata* has unarmed legs, like the new species, but is much shorter (3.35 mm) and has five distinct white maculae on forewings besides whitish areas inside cells (Fig. 17A), whereas *P. amapaensis* has only three white maculae (Fig. 1A).

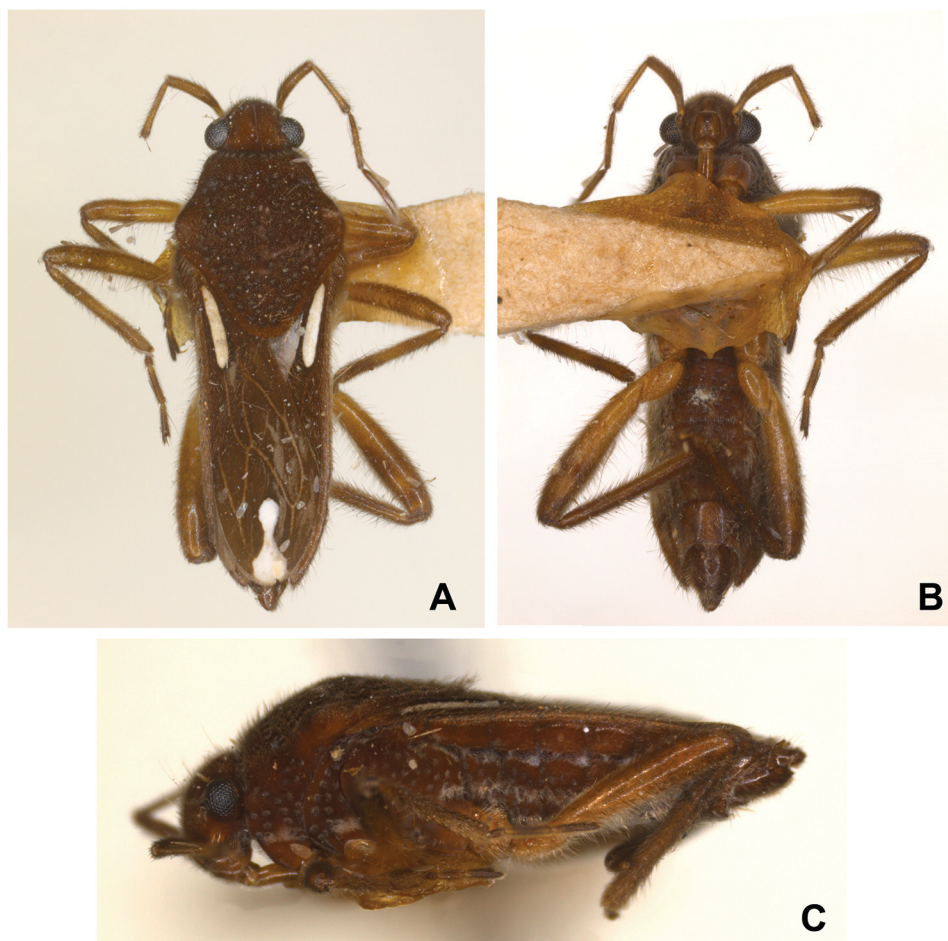


FIGURE 1. *Paravelia amapaensis* **sp. nov.** Male holotype, (A) dorsal view, (B) ventral view, (C) lateral view.

***Paravelia bahiana* Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.**

(Figs 2, 3C–F, 21)

Macropterous male. BL 4.58; HL 0.65; HW 0.89; ANT I lost, ANT II lost, ANT III lost, ANT IV lost; EYE 0.20; PL 1.83; PW 1.61; FORELEG: FEM 1.14, TIB 1.11, TAR I 0.13, TAR II 0.19, TAR III 0.26; MIDLEG: FEM 1.25, TIB 1.31, TAR I 0.13, TAR II 0.30, TAR III 0.28; HINDLEG: FEM 1.81, TIB 1.89, TAR I 0.13, TAR II 0.36, TAR III 0.29.

Head dark brown, with lighter areas between midline and eyes on dorsal posterior portion, base of antennomeres and bucculae. Antennae lost. Eyes shining black. Article I of rostrum brown, II–III yellowish brown, IV shining black. Pronotum with anterior lobe brown with silvery pubescence laterally; posterior lobe dark brown (Fig. 2A). Forewings brown, with darker veins; a suboval white macula proximally, not reaching humeral angle and surpassing apex of pronotum; and a suboval large white macula distally, not touching apex (Fig. 2A). Pro- and metapleura brown, mesopleura dark brown; all with silvery pubescence (Fig. 2C). Visible parts of acetabula and venter of thorax brown. Legs brown to dark brown. Exposed portions of connexives dark brown. Abdominal sternites brown, darker laterally. Genital segments brown to dark brown.

Head velvety, with a pair of shining oblique impressions in posterior region, without black denticles dorsally or

on bucculae; black denticles on ventral side of antenniferous tubercles and on jugum. Ocular setae present. Rostrum reaching midcoxae.

Pronotum covered by short golden setae and laterally by black setae; central longitudinal carina present, from collar to apex of posterior lobe, posteriorly extended together with posterior angle of pronotum (Fig. 3F). Forewings reaching base of genital segments, with some short setae only on outer margin. Transverse rows of rounded punctations present on posterior portion of propleura, anterior portion of mesopleura, and middle of metapleura. Venter of thorax with long black setae. Intersegmental area between meso- and metasternum centrally with two pairs of tubercles. Legs covered by short thick setae and longer thinner setae, more densely on venter of femora. Grasping comb present on distal 1/6 of fore tibia. Fore and middle tibiae, and femora without spines or spine-like setae. Hind femur with two rows of spines - ventralmost with 2–3 obtuse spines, dorsalmost with 9 obtuse spines – and a larger sharper curved spine displaced from the rows.

Connexives covered by brown setae. Venter of abdomen covered by short light setae and small black denticles, larger and more numerous laterally. Last abdominal sternite without carina, depression or projection, with posterior margin concave (Fig. 2D). Genital segment I with dorsal anterior margin convex (Fig. 3C); posterior region with dark brown setae and rounded posterior margin dorsally (Figs 3C–D). Proctiger without expansions or black denticles (Fig. 3E). Parameres elongated, with a small notch on dorsal surface near base, several setae on ventral margin, and rounded apex (Fig. 3E).

Macropterous female. BL 4.58–4.77; HL 0.61–0.74; HW 0.89–0.90; ANT I 0.64–0.65, ANT II 0.43–0.44, ANT III lost, ANT IV lost; EYE 0.24–0.25; PL 1.56–1.64; PW 1.50–1.58; FORELEG: FEM 1.18–1.25, TIB 1.01–1.04, TAR I 0.10–0.13, TAR II 0.15–0.18, TAR III 0.23–0.26; MIDLEG: FEM 1.30–1.40, TIB 1.39, TAR I 0.13, TAR II 0.25, TAR III 0.26; HINDLEG: FEM 1.64–1.70, TIB 1.76–1.85, TAR I 0.13, TAR II lost, TAR III lost.

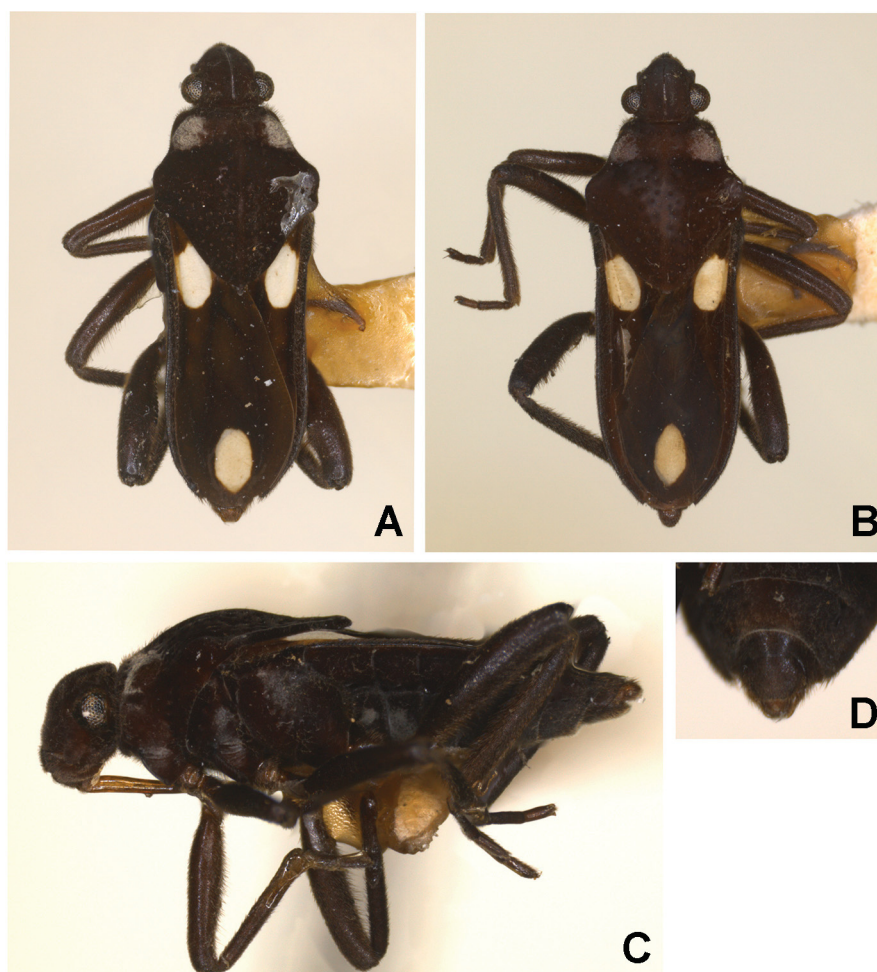


FIGURE 2. *Paravelia bahiana* sp. nov. (A) Dorsal view of male holotype, (B) dorsal view of female paratype, (C) lateral view of male, (D) ventral view of male abdomen apex.

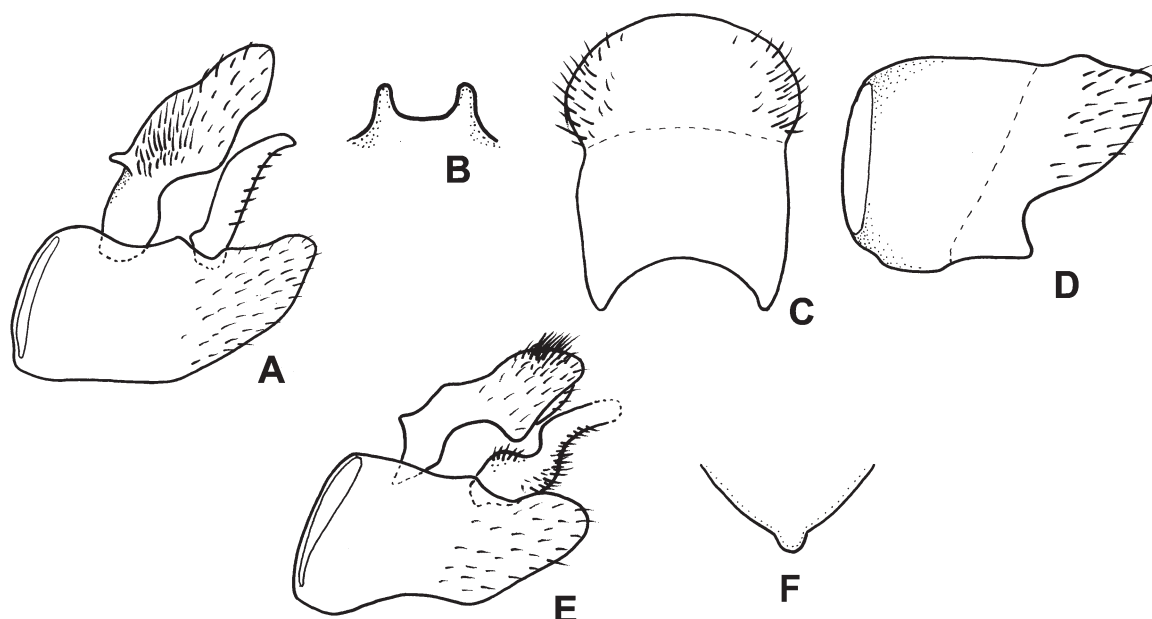


FIGURE 3. *Paravelia amapaensis* **sp. nov.** (A) Lateral view of genital capsule of male, (B) frontal view of projections on male proctiger. *Paravelia bahiana* **sp. nov.** First genital segment of male, (C) dorsal view, (D) lateral view; (E) lateral view of genital capsule of male, (F) posterior angle of pronotum.

Color and general body structure almost identical to male (Fig. 2B). Antennomeres I–II present, light brown, covered by short brown setae and longer thinner brown setae. Antennomere I stoutest, curved outward; segment II cylindrical, less robust than I. Hind femur with 3–4 obtuse spines on ventralmost row, dorsalmost row with 4–5 short spines; larger curved spine less displaced from dorsal row than in males.

Type-material. Holotype: Brazil, **Bahia**: macropterous male (MNRJ), Salvador, Pituba, VII.1951, (Dalcý). Paratypes: 2 macropterous females (MNRJ), same data as holotype.

Distribution. Known only from the coast of Bahia State (Fig. 21), and the only species of the genus recorded from the area up to the present.

Etymology. Named after the Bahia State, northeastern Brazil, where the type material was collected.

Discussion. The new species can be differentiated from other species of the genus by the presence of black denticles on venter of head and all extension of abdominal sternites, but neither on dorsum of body nor on legs. Black denticles are present on the abdomen of other *Paravelia*, like *P. kahli* (Drake & Harris, 1933), *P. parilis* (Drake & Harris, 1933), *P. nexa* (Drake & Harris, 1993), *P. ornata* **sp. nov.**, *P. rotundanotata* (Hungerford, 1930) and *P. splendoris* (Drake & Harris, 1933); however, the distribution of black denticles on the abdomen of the new species is unique.

In *P. ornata* **sp. nov.** and *P. rotundanotata*, black denticles are present on head, thorax, margins of connexives, and sides of last abdominal sternite, but not on center of last abdominal sternite or on other abdominal sternites. The number and shape of forewing maculae also separates these species (Figs 10 and 18B respectively). *Paravelia kahli*, *P. parilis*, and *P. nexa* have black denticles on abdominal connexives, but not on sternites, and are shorter than *Paravelia bahiana* **sp. nov.**, ranging from 3.5 to 4.0 mm. The original description also mentions the presence of lateral triangular teeth on male genital segment I, absent on the new species. Finally, unlike *P. bahiana* **sp. nov.**, in *P. splendoris* (Figs 18C–D) the entire body is conspicuously armed with black denticles. The spines are prominent and directed upward, whereas they are short and appressed to the body in *P. bahiana* **sp. nov.**

***Paravelia bilobata* Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.**
(Figs 4, 6A–F, 21)

Macropterous male. BL 5.03–5.07; HL 0.70–0.77; HW 0.96–1.02; ANT I 0.75–0.80, ANT II 0.63–0.65, ANT III 0.60–0.62, ANT IV 0.68–0.71; EYE 0.26–0.30; PL 1.95–2.00; PW 1.16–1.75; FORELEG: FEM 1.26–1.33, TIB

1.23–1.25, TAR I 0.10–0.12, TAR II 0.20–0.27, TAR III 0.31–0.32; MIDLEG: FEM 1.50–1.62, TIB 1.52–1.53, TAR I 0.13, TAR II 0.40, TAR III 0.33–0.37; HINDLEG: FEM 1.73–1.82, TIB 1.85–1.92, TAR I 0.13, TAR II 0.36–0.38, TAR III 0.34–0.37.

Head, sides and venter of body brown to dark brown. Antennae brown to light brown, with base of segments III and IV darker. Eyes shining black. Articles I–III of rostrum light brown; central region of segment I and entire IV shining black; segment III shining centrally, and pale laterally in basal two thirds. Pronotum dark brown, with border of posterior lobe lighter. Forewing dark brown, with veins lighter; an elongated white macula not starting from humeral angle and distinctly surpassing apex of pronotum; on apex, a white tear-like macula touching the posterior margin of wing, and in front of it, other smaller white rounded macula (Fig. 4A). Acetabula orange brown. Coxae, trochanters, and anterior half of femora light brown to yellowish brown; posterior half of femora and tibiae brown. Tarsomeres with intersegmental regions lighter, and middle darker.

Head covered by golden setae, with a pair of small narrow strips at posterior portion impressed and shining, without black denticles. Antennae densely covered by shorter golden setae and few longer dark brown setae. Antennomere I stoutest, curved outward; II thicker than III–IV; III–IV with subequal width; segment IV fusiform (Fig. 4A). Ocular setae present. Rostrum reaching posterior margin of mesoacetabula.

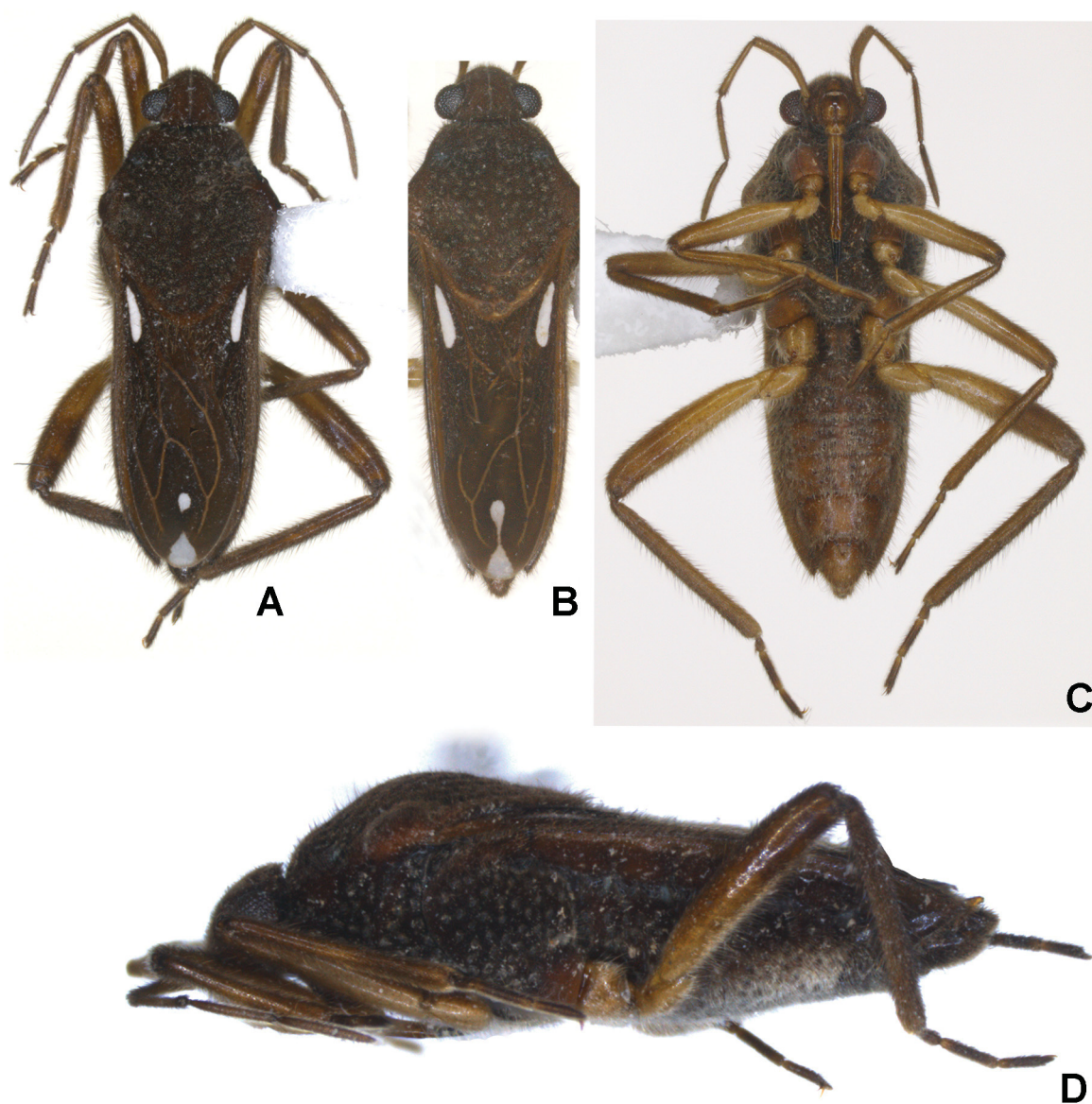


FIGURE 4. *Paravelia bilobata* sp. nov. Male, dorsal view, (A) holotype, (B) paratype, (C) ventral view of paratype, (D) lateral view of holotype.

Pronotum covered by short golden setae and longer dark brown setae, with weak longitudinal median carina, more evident in anterior half. Humeri slightly elevated, with outer margin rounded. Posterior angle of pronotum rounded (Fig. 4A). Forewings reaching base of genital segments, with distinct veins and covered by golden setae on outer proximal portions. Sides of thorax (Fig. 4D) and abdomen, except for abdominal sternite VII (Fig. 6D), densely covered by suboval punctations and long golden setae. Intersegmental regions between meso- and metasternum with a pair of small tubercles. Legs covered by long golden setae, without spines or spine-like setae (Figs. 4A, C). Grasping comb present on distal 1/5 of fore tibia.

Abdominal connexives and tergites covered by golden and dark brown setae; connexives in lateral view with superior margin shining. Last abdominal sternite without projections or denticles, only with two small lobes (Fig. 6D). Dorsum of genital segment I covered by long dark brown setae, with posterior margin notched, forming a small lobe centrally (Fig. 6A); venter with anterior margin concave centrally, and posterior margin converging distinctly to the apex (Fig. 6C). Proctiger covered by long dark brown setae, more concentrated in dorsal surface; anteriorly with a pair of bilobed projections in superior margin, and inner lobe smaller (Figs. 6E–F). Parameres symmetrical, curved in dorsal surface, with a row of light setae on posterior portion of ventral surface (Fig. 6E).

Intraspecific variation. A substantial variation in the shape of the apical macula of this species, where one of the two specimens analyzed has the macula medially constricted, represented by a longitudinal white thin line (Fig. 4B), while in the other specimen this line does not exist (Fig. 4A).

Type-material. Holotype: Brazil, **Mato Grosso**: macropterous male (DPIC), Nova Xavantina, Mario Viana Municipal Reserve (Bacaba Municipal Park), Córrego Bacaba, 14°43'14.80"S/ 52°21'35.63"W, 11.X.2003, (S.O. Pagioro). Paratype: 1 macropterous male (MZUSP), Córrego da Mata, fourth order, 15°01'32"S/ 52°26'29"W, 17.XI.2005, [1788], (H.S.R. Cabette *et al.*).

Distribution. Known so far from the Mato Grosso State (Fig. 21), central-western Brazil.

Etymology. *bi-* (Latin), two; *lob-*, lobe; and suffix *-ata* (Latin), characterized by having; referring to the pair of bilobed projections on dorsal surface of proctiger, unusual in the genus.

Discussion. The new species has the same suboval punctations on sides and venter of body as *P. amapaensis* sp. nov., *P. anta*, *P. dilatata*, *P. foveata* and *P. hungerfordi*. However, it is separated from these species by the maculae on the forewing (Figs 4A–B); posterior margin of the first genital segment notched, with a small median lobe (Fig. 6D); and by the pair of bilobed projections (Figs. 6E–F) on basal region of proctiger. *Paravelia anta* also has a pair of basal projections on proctiger, but similar to horns.

***Paravelia bipunctata* Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.**

(Figs 5, 6G–I, 21)

Micropterous male. BL 4.75–4.95; HL 0.62–0.63; HW 0.87–0.89; ANT I 0.79–0.80, ANT II 0.80–0.82, ANT III 0.87–0.88, ANT IV 0.69–0.70; EYE 0.25–0.27; PL 1.25; PW 1.45–1.48; FORELEG: FEM 1.31–1.39, TIB 1.15–1.26, TAR I 0.08–0.09, TAR II 0.10–0.11, TAR III 0.34–0.35; MIDLEG: FEM 1.70–1.76, TIB 1.82–1.84, TAR I 0.14, TAR II 0.63–0.66, TAR III 0.40–0.44; HINDLEG: FEM 1.75–1.76, TIB 1.89–1.90, TAR I 0.14–0.15, TAR II 0.28–0.31, TAR III 0.41–0.42.

Head dark brown to black. Antenniferous tubercles dark brown; antennomere I with base and distal half dark yellow, brown on central portion, lighter ventrally; remaining antennomeres brown, darker on apex of II. Eyes shining red. Rostrum with base of article I, entire article II, and apex of III brown; remaining of these articles yellow; article IV shining dark brown. Pronotum dark brown, with longitudinal median carina brown; anterior lobe with a pair of large white marks on sides of median line (Fig. 5A); posterior lobe becoming lighter towards apex, light brown to yellowish on posterior angle. Micropterous wing white in margins, brown in middle (Fig. 5A). Sides and vertex of thorax dark brown. Fore and hind coxae, and all trochanters pale yellow. Mid coxa brown, lighter on apex. Fore and hind femora with proximal half pale yellow and distal half brown with a yellow ring near apex. Mid femur of similar color, except for brown mark on proximal 1/6. Tibiae brown, with a proximal and a distal yellow ring; the distal brown portion of hind tibia lighter. Anterior tarsus with articles I–II brown and III yellow with brown to dark brown apex. Mid and hind tarsi with article I brown and II–III yellow with brown apices. Abdominal tergites I–II dark brown; III–VI brown with darker margins; VII brown with lateral margins dark brown and posterior margin black. Silvery pubescence present on posterior margin of tergite V, majority of tergite VI, and

anteriorly on sides of midline of tergite VII. Abdominal connexives dark brown, with silvery pubescence on outer portions between segments I–II, II–III, and III–IV; silvery pubescence wider between segments IV–V and V–VI (Fig. 5A). Abdominal sternites dark brown, with orange areas between segments, except for last segment blackish. Genital segment I shining black; remaining genital segments brown, darker apically.

Head velvety, with long thick dark setae on frons and adjacent to inner eye margin, and a pair of rounded impressions near base, without black denticles. Ocular setae absent. Antenniferous tubercles wide and swollen. Antenna densely covered by long brown setae. Antennomere I distinctly thicker than others, wider on middle, curved outward; II–III cylindrical; II slightly thicker than III–IV; III–IV subequal in width; IV fusiform. Bucculae swollen, covered by long light setae, with a rounded punctation near middle, without black denticles. Rostrum almost reaching base of metasternum. Head and pronotum laterally separated by a stripe of white swollen cuticle, which extends ventrally over propleura and proepisternum, almost meeting centrally (Fig. 5B).

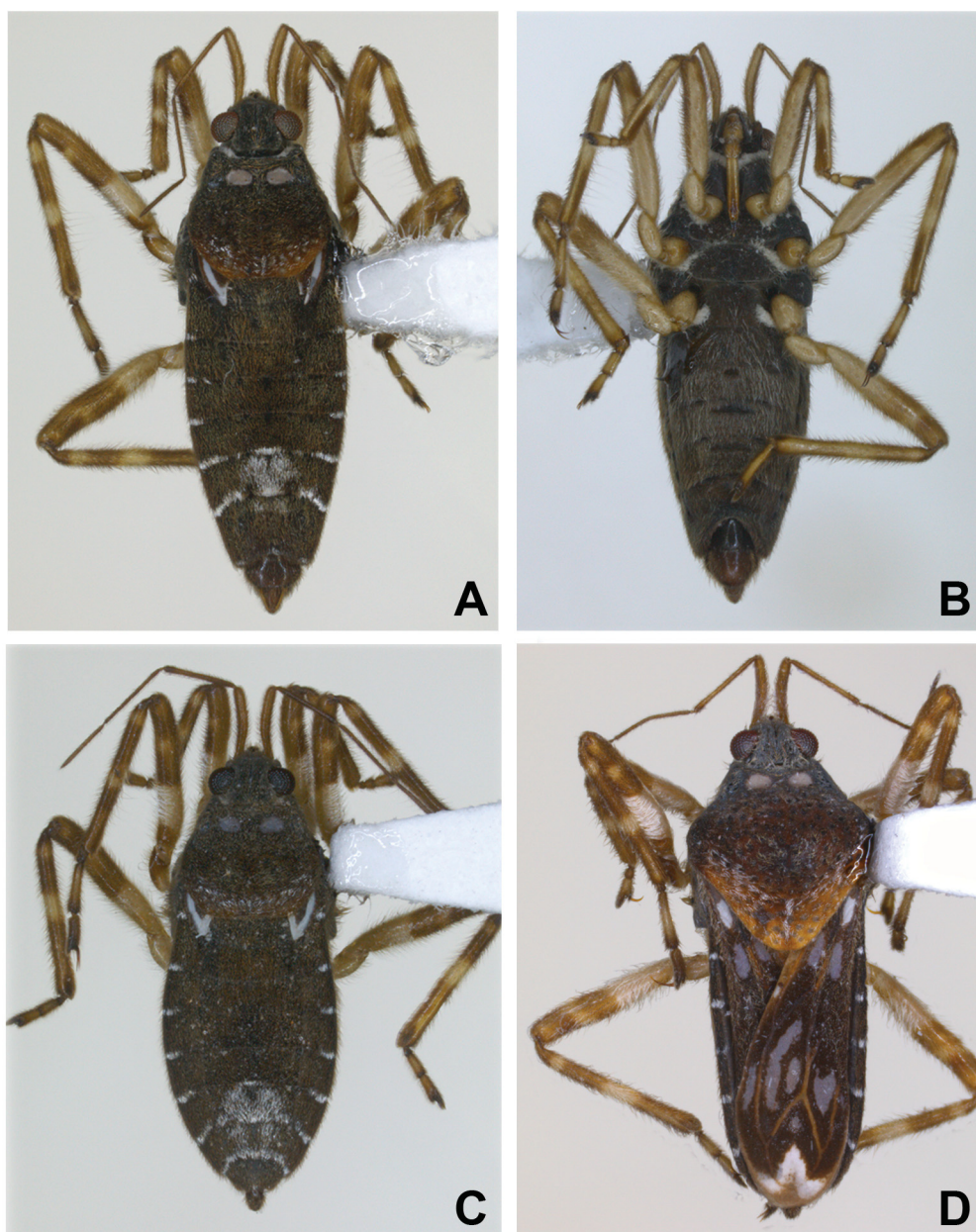


FIGURE 5. *Paravelia bipunctata* sp. nov. (A) Dorsal view of micropterous male (holotype), (B) ventral view of micropterous male (holotype), (C) dorsal view of micropterous female (paratype), (D) dorsal view of macropterous female (paratype).

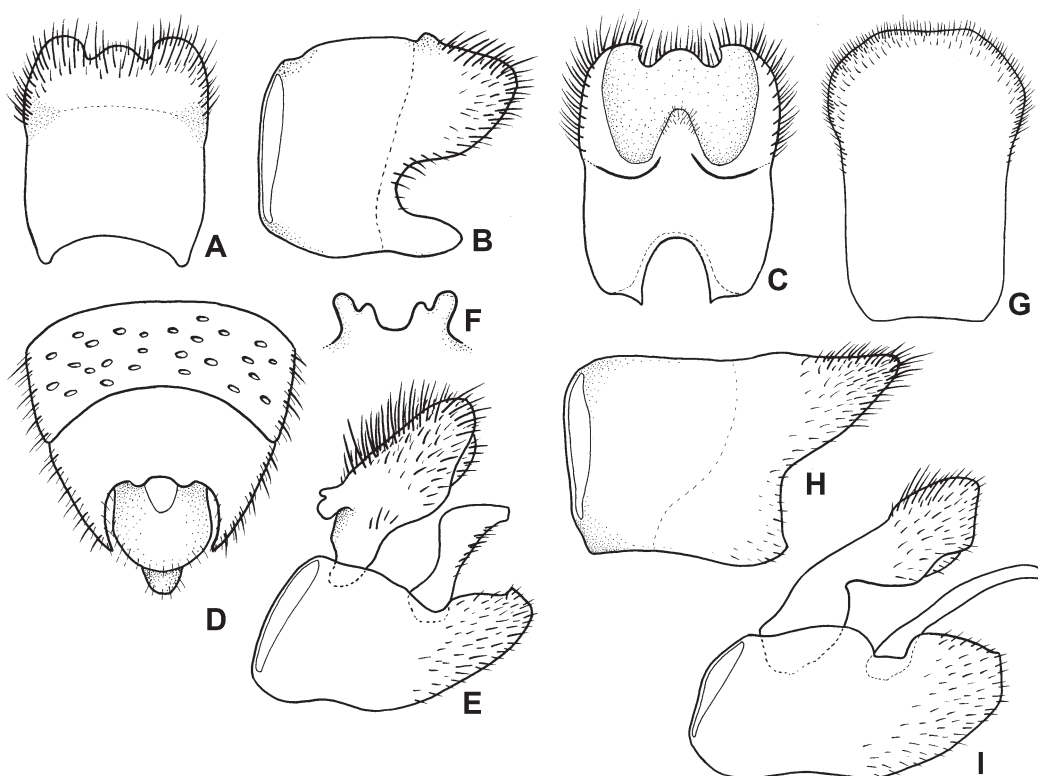


FIGURE 6. *Paravelia bilobata* sp. nov. First genital segment of male: (A) dorsal view, (B) lateral view, (C) ventral view. (D) Ventral view of male abdomen apex, (E) lateral view of genital capsule of male, (F) frontal view of projections on male proctiger. *Paravelia bipunctata* sp. nov. First genital segment of male, (G) dorsal view, (H) lateral view. (I) Lateral view of genital capsule of male.

Pronotum covered by recumbent white setae, more numerous on posterior portion, and short brown setae on lateral margins, with longitudinal median carina weakly developed and humeri not elevated, without black denticles. Anterior lobe of pronotum slightly depressed on white marks; rounded punctations on posterior lobe wider and deeper towards apex. Micropterous wings slightly passing posterior margin of abdominal tergite I (Fig. 5A). Sides of thorax with white swollen cuticle on intersegmental areas and between metathorax and abdomen; the white areas extending ventrally under coxae (Fig. 5B). Two rows of small rounded punctations on posterior portion of propleura and one on anterior portion of mesopleura. Sides and venter of thorax covered by long thin white setae; these setae longer on metasternum and abdominal sternites I–II. Intersegmental area between meso- and metasternum without tubercles. Mesoacetabulum with a large deep punctation, not extended centrally. Legs densely covered by long light setae, without distinctly swollen segments; fore femur also densely covered by shorter conical black setae on posterior margin. Fore and hind tibiae posteriorly flattened, with several short black denticles throughout their length; distal half of hind femur also with short black denticles. Middle tibia on inner margin of posterior portion with a row of long darker setae. Grasping comb on fore tibia not well-developed.

Abdominal connexives and tergites covered by short golden brown setae. Abdominal tergites I–II slightly swollen centrally. Posterior margin of last abdominal tergite sharply concave. Abdominal connexives very weakly elevated, without black denticles. Abdominal sternites I–II, and sides of remaining sternites covered by long thin white setae. Anterior margin of abdominal sternites III–VII with transversal areas without setae (Fig. 5B). Last abdominal sternite slightly compressed laterally, weakly swollen adjacent to anterior margin, with posterior margin widely concave, without distinct projections or denticles (Fig. 5B). Genital segment I (Figs 6G–H) with lateral margins of dorsum slightly divergent on posterior half, and posterior margin centrally straight (Fig. 6G); venter slightly compressed laterally, with anterior margin concave centrally. Proctiger without expansions or black denticles (Fig. 6I), with weak longitudinal carina and small lateral projections. Parameres symmetrical, long, thin and slightly curved on apical 1/3, without setae (Fig. 6I).

Macropterous male. BL 5.20–5.40; HL 0.62–0.65; HW 0.90–0.95; ANT I 0.85–0.90, ANT II 0.84–0.87,

ANT III 0.82–0.87, ANT IV 0.68–0.70; EYE 0.32–0.35; PL 1.85–1.90; PW 1.95–2.10; FORELEG: FEM 1.25–1.30, TIB 1.15–1.20, TAR I 0.07, TAR II 0.12, TAR III 0.37; MIDLEG: FEM 1.65–1.70, TIB 1.75, TAR I 0.07–0.10, TAR II 0.67, TAR III 0.37–0.42; HINDLEG: FEM 1.70–1.75, TIB 1.82–1.85, TAR I 0.09–0.12, TAR II 0.30–0.35, TAR III 0.45.

Color and general body structure as in micropterous male. Pronotum longer than in brachypterous form, with weaker median carina and elevated humeri. Forewing brown, almost reaching apex of genital segments, with lighter veins and densely covered by golden setae, mainly in anterior half; when dried and closed, with three elongated whitish maculae, the basal being more white, four to seven irregular whitish maculae near middle, an apical white macula centrally extended anteriorly.

Micropterous female. BL 5.00–5.10; HL 0.66–0.75; HW 0.92–0.95; ANT I 0.83–0.90, ANT II 0.77–0.85, ANT III 0.87–0.90, ANT IV 0.65–0.67; EYE 0.26–0.30; PL 1.30–1.35; PW 1.50; FORELEG: FEM 1.30–1.32, TIB 1.20, TAR I 0.09–0.10, TAR II 0.10–0.12, TAR III 0.35–0.37; MIDLEG: FEM 1.71–1.85, TIB 1.83–1.92, TAR I 0.12–0.13, TAR II 0.57–0.62, TAR III 0.40–0.42; HINDLEG: FEM 1.69–1.80, TIB 1.80–1.88, TAR I 0.11–0.13, TAR II 0.27–0.32, TAR III 0.37–0.43.

Color and general body structure as in micropterous male (Fig. 5C), but fore tibia without grasping comb; abdominal connexives elevated, almost vertical; tergite VII covered almost entirely by silvery pubescence, and tergite VIII with few of the same pubescence; last abdominal sternite not slightly compressed laterally.

Macropterous female. BL 5.25–5.56; HL 0.63–0.65; HW 0.95; ANT I 0.78–0.83, ANT II 0.80, ANT III 0.84–0.85, ANT IV 0.68–0.70; EYE 0.28–0.30; PL 1.80–2.01; PW 2.00–2.08; FORELEG: FEM 1.30–1.31, TIB 1.15–1.26, TAR I 0.08–0.10, TAR II 0.10–0.13, TAR III 0.37–0.39; MIDLEG: FEM 1.65–1.90, TIB 1.75–1.99, TAR I 0.12–0.13, TAR II 0.62–0.64, TAR III 0.42–0.45; HINDLEG: FEM 1.75–1.91, TIB 1.85–1.99, TAR I 0.10–0.13, TAR II 0.28–0.30, TAR III 0.42–0.48.

Color and general body structure (Fig. 5D) as in micropterous female; pronotum and forewings as in macropterous male; generally lighter, especially on venter, which reveals the presence of several rounded punctations on acetabulae.

Type-material. Holotype: Brazil, **Minas Gerais**: micropterous male (DPIC), Brumadinho, Retiro das Pedras, 20°04'S/ 44°00'W, house condominium located 15 Km south from Belo Horizonte city, first semester.1999, (G.J.C. Vianna). Paratypes: 4 micropterous males, 1 micropterous female (DPIC), same data as holotype; 1 micropterous female (DPIC), same data, except 07.II.1999; 1 micropterous male (DPIC), Januária, São Joaquim, Rio Jaboticaba, bridge, 15°29'39"S/ 45°08'59"W, 29.IV.2008, (G.J.C. Vianna); 1 micropterous male (DPIC), same data, except ALM 1205, 07.VIII.2012, (A.L. Melo); 1 micropterous male, 1 micropterous female (DPIC), Rio Doce, Baraúnas Farm, 20°14'31"S/ 42°54'60"W, 28.XI.1999, (A.L. Melo); 1 micropterous male (INPA), Luz, Ribeirão Jorge Grande, 19°40'13"S/ 45°36'37"W, 06.I.2010, (H.D.D. Rodrigues); 1 micropterous female (DPIC), Pains, Monalisa Farm, Córrego Caeté dos Veados, 21.I.2002, (S.N. Alves); 1 micropterous female (MZUSP), Serra do Cipó, Cardeal Mota, MG-010, Km-117, 26.VII.1972, (C.G. Froehlich); 2 micropterous females, (DPIC), same data, except Km-120, temporary pool, 02.IV.1994, (A.L. Melo); 1 micropterous male (DPIC), same data, except Km-117, 27.XII.1998; 1 micropterous male (DPIC), Santana do Riacho, Lapinha da Serra, pool before Lajeado Waterfall, 19°09'13"S/ 43°38'54"W, 02.IV.2010, (H.D.D. Rodrigues). **Mato Grosso**: 1 macropterous female (CZNX), Nova Xavantina, Mario Viana Municipal Reserve (Bacaba Municipal Park), Córrego Bacaba, ponto 1, 14°43'3.5"S/ 52°21'48.3"W, 09.VIII.2011, [5198], (N.F.S. Giehl & P.V.B. Fonseca); 1 macropterous female (MZUSP), same data, except 01.VI.2011, [5906]; 1 macropterous female (CZNX), same data, except ponto 2, 14°43'10.5"S/ 52°21'35.07"W, 04.VII.2011 [6077]; 1 macropterous male (MZUSP), same data, except ponto 3, 14°43'14.80"S/ 52°21'35.63"W, 29.VI.2012, [6728]; 1 macropterous male (CZNX), same data, except [6729]; 1 micropterous male (DZRJ), same data, except 10.V.2003, (S.O. Pagioro); 1 macropterous female (DZRJ), Nova Xavantina, ML4 Farm, Córrego Cachoeirinha, third order, 14°50'33"S/ 52°21'34"W, 13.IX.2007, (H.S.R. Cabette). **Mato Grosso do Sul**: 1 micropterous male (INPA), Bodoquena, California Farm, stream tributary to Córrego Ouro Fino, 20°43'37.0"S/ 56°51'39.1"W, 18.III.2012, (N. Hamada, P.V. Cruz & N. Zampiva).

Distribution. So far known from three Brazilian states (Fig. 21), from the Central-West and Southeast regions of the country.

Etymology. *bi-* (Latin), two; *punct-* (Latin), punctuation; and suffix *-ata* (Latin), characterized by having; referring to the pair of white marks on anterior lobe of pronotum.

Discussion. The new species can be distinguished from all other species of the genus by the pronotum dark

brown with a pair of large white maculae on anterior lobe; presence of white swollen areas of cuticle on thorax (Fig. 5B); number and distribution of white maculae on forewings (Fig. 5D); presence of short black denticles on male and female femora and tibiae; and shape of last abdominal sternite (Fig. 5B), proctiger, and parameres of male (Fig. 6I).

Paravelia bipunctata **sp. nov.** superficially resembles *P. capixaba* Moreira, Nessimian & Rúdio, 2010 and *P. conata* (Hungerford, 1929). In relation to *P. capixaba* (Figs 14C–D), the two species share abundant long setae on antennae and legs, absence of small tubercles between meso- and metasternum, the presence of a large and deep punctation on inner portion of mesoacetabulum, and short conical setae on venter of fore femur. The new species is, however, much darker than *P. capixaba*, very long dorsal setae are present only on the body of the latter, and the structure of mesoacetabulum is centrally extended only in *P. capixaba*. The fore tibial grasping comb is very evident in *P. capixaba*, but not distinct in *P. bipunctata* **sp. nov.**, and male parameres are much thinner and longer on the latter species. In the case of *P. conata* (Fig. 15A), both species have the following characters in common: a pair of white maculae on anterior lobe of pronotum; color pattern of legs; short conical black setae and short black denticles on fore and hind tibiae; areas between abdominal connexives covered by silvery pubescence; and anterior margin of sternites III–VII with transversal areas without setae. However, *P. conata* has a large conical projection on dorsum of pronotum (Fig. 15A), absent in the new species.

***Paravelia lacrymosa* Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.**

(Figs 7, 9A, 21)

Macropterous female. BL 5.52; HL 0.80; HW 1.02; ANT I 0.70, ANT II 0.60, ANT III 0.68, ANT IV 0.80; EYE 0.28; PL 2.20; PW 2.05; FORELEG: FEM 1.25, TIB 1.27, TAR I 0.10, TAR II 0.20, TAR III 0.42; MIDLEG: FEM 1.52, TIB 1.62, TAR I 0.10, TAR II 0.37, TAR III 0.42; HINDLEG: FEM 1.87, TIB 2.25, TAR I 0.15, TAR II lost, TAR III lost.

Head dark brown to black; lighter below antenniferous tubercles. First antennal segment yellowish brown to brown, remaining segments dark brown. Eyes dark red. Rostrum brown, except apex of article III and IV, shining black. Pronotum dark brown to black, anterior lobe lighter. Pro-, meso- and metapleura dark brown; acetabula brown. Prosternum brown, meso- and metasternum darker. Coxae, trochanters, and base of femora light brown, remaining of legs darker. Forewing dark brown, veins lighter, with black areas between cells; tear-shaped white macula at base, starting from humeral angle and surpassing the posterior margin of pronotum; a small elongated white macula on apex (Fig. 7A). Abdominal segments light brown, with a dark brown band in the region of spiracles; genitalia yellowish brown (Figs 7B–C).

Head covered by golden pubescence, and long dark setae more concentrated medially in front of eyes, with a pair of rounded punctations near posterior margin. Antenniferous tubercles shiny and swollen. Antennae finely pubescent; antennomere I stoutest, curved outward; segment II shorter; segment IV longer than III (Fig. 7A). Ocular setae present. Jugum with minute black denticles. Rostrum reaching base of mesocoxae.

Pronotum covered by black setae, more concentrated on anterior lobe and apex of posterior lobe; median carina present, more evident between humeral angles, which are slightly elevated. Posterior lobe with lateral margins near apex slightly elevated. Costal margins and radial veins of forewings with thick black setae. Propleura with a pruinose silvery area just behind eyes. Pro- and mesopleura each with a row of 4–5 rounded punctations, and metapleura with about 10 punctations, not arranged in rows. Pronotal collar with 5 rounded punctations. Intersegmental region between meso- and metasternum with two pairs of small tubercles. Mesoacetabula with a rounded punctation near mesosternum. Legs covered by fine, short, golden setae, sparsely intermixed with long setae; without spines (Fig. 7B). Foreleg with small grasping comb.

Connexiva and lateral margin of abdominal segments covered by golden pubescence and long dark setae. Abdominal connexives slightly elevated. Posterior angle of last connexival segment slightly developed (Fig. 9A). Superior portion of gonocoxae, and lateral area of posterior margin of abdominal tergite VII with small black denticles.

Type-material. Holotype: Brazil, **Minas Gerais**: macropterous female (MZUSP), Serra do Caraça, 1.380 m a.s.l., XI.1961, (Kloss, Lenko, Martins & Silva).

Distribution. Only the holotype collected at high altitude on Serra do Caraça, a mountain range which

includes areas of the municipalities of Santa Bárbara and Catas Altas (Fig. 21), Southeastern Brazil, is known up to the present.

Etymology. *lacrimosus*- (Latin), tear; referring to the tear-shaped maculae on the forewings.

Discussion. The new species can be distinguished from all other species of the genus mainly by the length of body (5.52 mm); dorsal coloration dark brown, contrasting with the light brown of the abdominal segments; anterior lobe of pronotum without distinct maculae or pruinose areas; white tear-shaped basal maculae on forewings (Fig. 7A); absence of rounded punctations on abdominal sternites; and gonocoxae and posterior margin of abdominal tergite VII with black denticles.

Other species recorded from mountain ranges of Minas Gerais State are *P. bipunctata* **sp. nov.** (Fig. 5), *P. lanemelo* Moreira & Barbosa, 2012 (Fig. 17B) and *P. nieseri* Moreira & Barbosa, 2012 (Fig. 17D). These can be distinguished from *P. lacrymosa* **sp. nov.** by the basal macula of the forewing not starting from humeral angles, contrarily to *P. lacrymosa* **sp. nov.** Also, in *P. lacrymosa* **sp. nov.** the basal maculae of forewings surpass the posterior margin of pronotum (which does not occur in *P. bipunctata* **sp. nov.**); exposed areas of connexives are dark brown (light brown in *P. lanemelo*), and head and posterior margin of pronotum are dark brown to black (orange in *P. nieseri*).

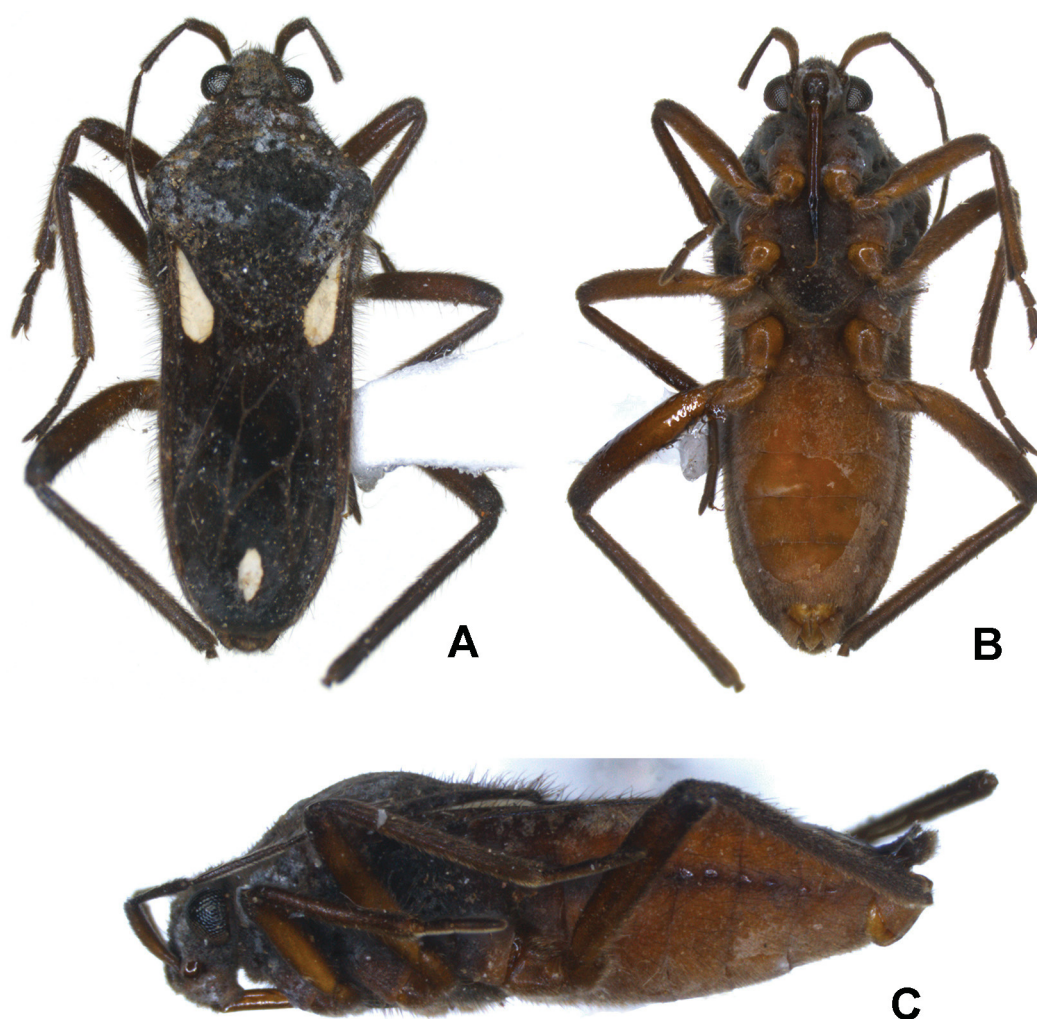


FIGURE 7. *Paravelia lacrymosa* **sp. nov.** Female holotype, (A) dorsal view, (B) ventral view, (C) lateral view.

***Paravelia micromaculata* Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.**
(Figs 8, 9B, 21)

Macropterous female. BL 4.90; HL 0.60; HW 0.95; ANT I 0.62, ANT II lost, ANT III lost, ANT IV lost; EYE

0.30; PL 2.05; PW 1.95; FORELEG: FEM 1.12, TIB 1.17, TAR I 0.10, TAR II 0.20, TAR III 0.37; MIDLEG: FEM 1.40, TIB 1.50, TAR I 0.12, TAR II 0.36, TAR III 0.40; HINDLEG: FEM 1.75, TIB 2.00, TAR I 0.12, TAR II 0.40, TAR III lost.

Head, sides, venter of body, and genital segments dark brown. Eyes shining dark brown. Antenniferous tubercle, antennomere I, articles I–II of rostrum, and legs brown to light brown, with base of tibia and tarsomeres darker; articles III–IV of rostrum and grasping comb of fore tibia shining black. Longitudinal median carina of pronotum darker. Forewings dark brown, with lighter veins; at base with a small rounded white macula, not starting from humeral angle and ending at posterior margin of pronotum; at apex a small oval white macula centrally (Fig. 8A).

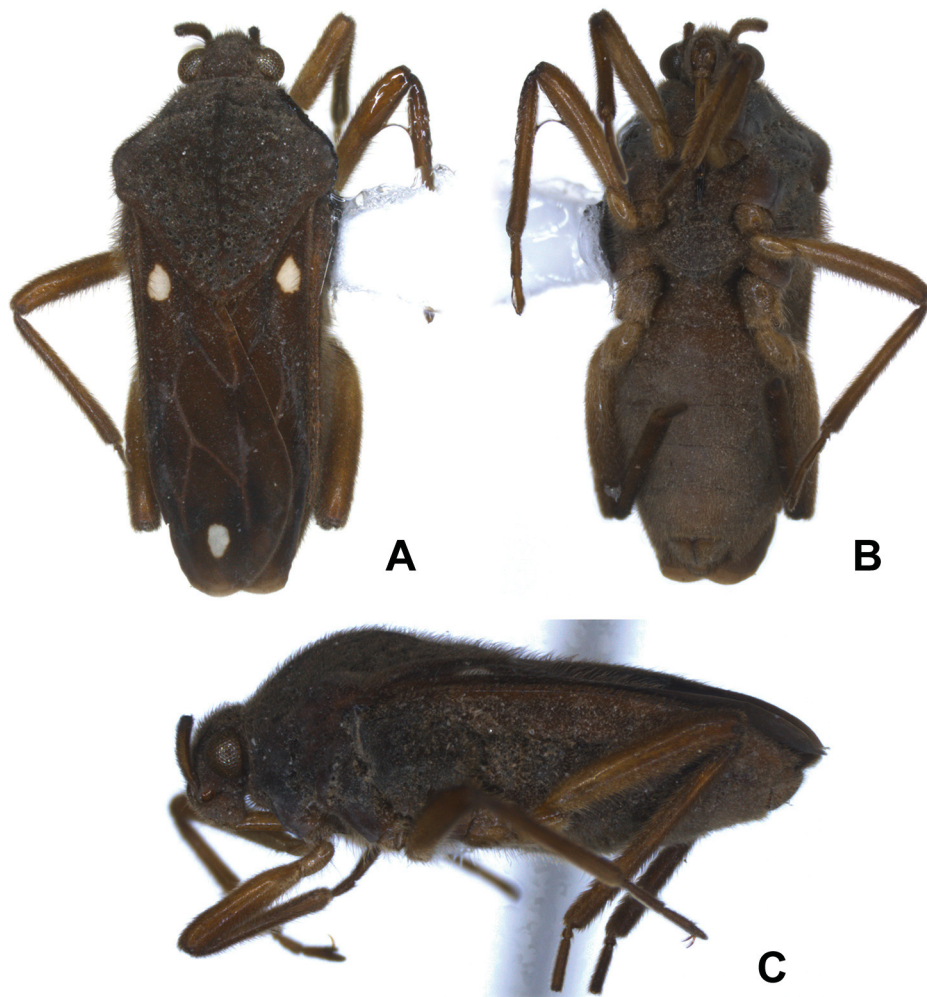


FIGURE 8. *Paravelia micromaculata* sp. nov. Female holotype, (A) dorsal view, (B) ventral view, (C) lateral view.

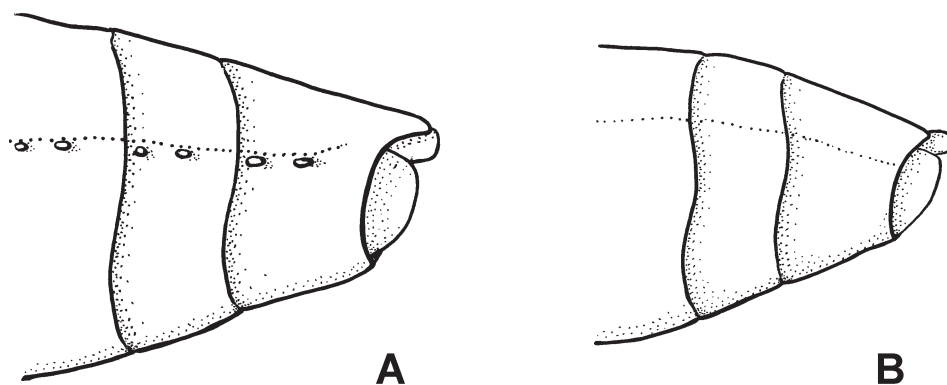


FIGURE 9. Lateral view of female abdomen. (A) *Paravelia lacrymosa* sp. nov., (B) *P. micromaculata* sp. nov.

Head covered by golden pubescence, with a pair of rounded punctations at posterior portion, near inner margin of eye, without black denticles. Antennomere I stoutest, curved outward; segments II–IV lost. Antenniferous tubercles shining and swollen (Fig. 8C). Ocular setae present. Buccula and jugum without black denticles. Rostrum reaching base of mesocoxae.

Pronotum covered by golden setae, longer on humeral angles and posterior portion; with longitudinal median carina. Humeri slightly elevated, without black denticles. Posterior lobe with posterior angle rounded (Fig. 8A). Two rows of small rounded punctations on posterior portion of propleura and one on anterior portion of mesopleura. Intersegmental area between meso- and metasternum centrally with two pairs of tubercles. Legs without spines or spine-like setae. Small grasping comb on apex of fore tibia.

Connexives slightly elevated, covered by golden setae. Venter of abdomen covered by golden setae, without black denticles. Last abdominal sternite without carina, depression or projections (Fig. 8B). Posterior angle of last connexival segment poorly developed (Fig. 9B). Superior portion of gonocoxae, and lateral area of posterior margin of abdominal tergite VII with black denticles.

Type-material. Holotype: Brazil, **Maranhão**: macropterous female (MZUSP), Aldeia Yavaruhu, Rio Gurupi, about 30 km west of Canindé, isolated trail, forest stream with mud, gravel and leaf litter, 14.II.1966, (B. Malkin).

Distribution. Only the holotype collected on the border region between Maranhão and Pará states (Fig. 21), northern Brazil, is known up to the present.

Etymology. *micro-* (Greek), small; *macul-* (Latin), macula; and suffix *-ata* (Latin), characterized by having; referring to the short size of both basal and apical maculae of forewings.

Discussion. After comparing with the original description of all species recorded from Brazil, and examining several described species, *P. micromaculata* **sp. nov.** can be distinguished from other species of the genus mainly by the length of body (4.90 mm); dark brown coloration; anterior lobe of pronotum without maculae or pruinose areas; unusual size of the basal and apical maculae of forewings, both very small (Fig. 8A); and gonocoxae and posterior margin of abdominal tergite VII with black denticles.

***Paravelia ornata* Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.**
(Figs 10, 12A–D, 21)

Macropterous male. BL 3.80–3.90; HL 0.50–0.55; HW 0.67–0.70; ANT I 0.75, ANT II 0.55, ANT III 0.75, ANT IV 0.75–0.77; EYE 0.18–0.21; PL 1.43–1.50; PW 1.40–1.50; FORELEG: FEM 1.10–1.15, TIB 1.12, TAR I 0.12, TAR II 0.17, TAR III 0.35; MIDLEG: FEM 1.35–1.37, TIB 1.40, TAR I 0.10–0.11, TAR II 0.32, TAR III 0.35–0.38; HINDLEG: FEM 1.62, TIB 2.03–2.10, TAR I 0.10–0.12, TAR II 0.50, TAR III 0.40–0.45.

Head, antennae, most of rostrum, legs except grasping comb and apex of tarsomeres, pro-, meso-, metasternum, abdominal segments, and genital segments orange to light orange brown. Article IV of rostrum, grasping comb of fore leg, part of forewing, and apex of all tarsomeres black. Eyes bright dark red. Transverse band on acetabula lighter than venter of thorax and touching coxae. Forewing with a triangular white macula at base, starting from humeral angle and surpassing posterior margin of pronotum; in front of it, a longitudinal white stripe, joining with another longitudinal stripe starting in the cubital vein and bordering the wing; a rounded white macula near apex (Fig. 10A).

Head covered by golden pubescence and scattered long dark setae, with a pair of oblique punctations on posterior region near inner margin of eyes; ventral surface covered by various minute black denticles. Antennae finely pubescent, with few long setae on last two articles. Antennomere I stoutest, curved outward; II shortest; III–IV as long as I (Fig. 10A). Ocular setae present. Gula, areas below eyes and along ventral portion of pronotal collar with minute black denticles. Rostrum reaching posterior margin of mesoacetabulum.

Pronotum with scattered long black setae, entirely covered by minute black denticles, more evident in humeral angles, which are slightly elevated; median carina present, but not very evident; a pair of subtriangular pruinose patches starting from anterior lobe and reaching posterior lobe on the row of rounded punctations that divides lobes (Fig. 10A); posterior lobe with rounded posterior angle. Costal margins and radial veins of forewings with long black setae. Pro- and mesopleura each with a row of 4–6 rounded punctations and scattered minute black denticles; pro-, meso- and metapleura with pruinose areas when viewed under certain light angles. Intersegmental region between meso- and metasternum with two pairs of small tubercles. Legs covered by fine short golden setae,

sparsely intermixed with long dark setae; without spines (Fig. 10B). Grasping comb (0.25 mm) present approximately on distal 1/5 of fore tibia.

Connexiva covered by minute black denticles and long dark setae. Abdominal segments laterally with pruinose areas when viewed under certain light angles, except for segment II and spiracles. Sternite VII flattened in the middle, without projections (Fig. 10C). Genital segment I with a small area of minute black denticles on posterior half (Fig. 12A). Proctiger slightly elevated in basal portion, near the pygophore (Fig. 12B). Parameres symmetrical, slightly curved, with apex rounded (Figs 12B–C); almost touching centrally above proctiger.

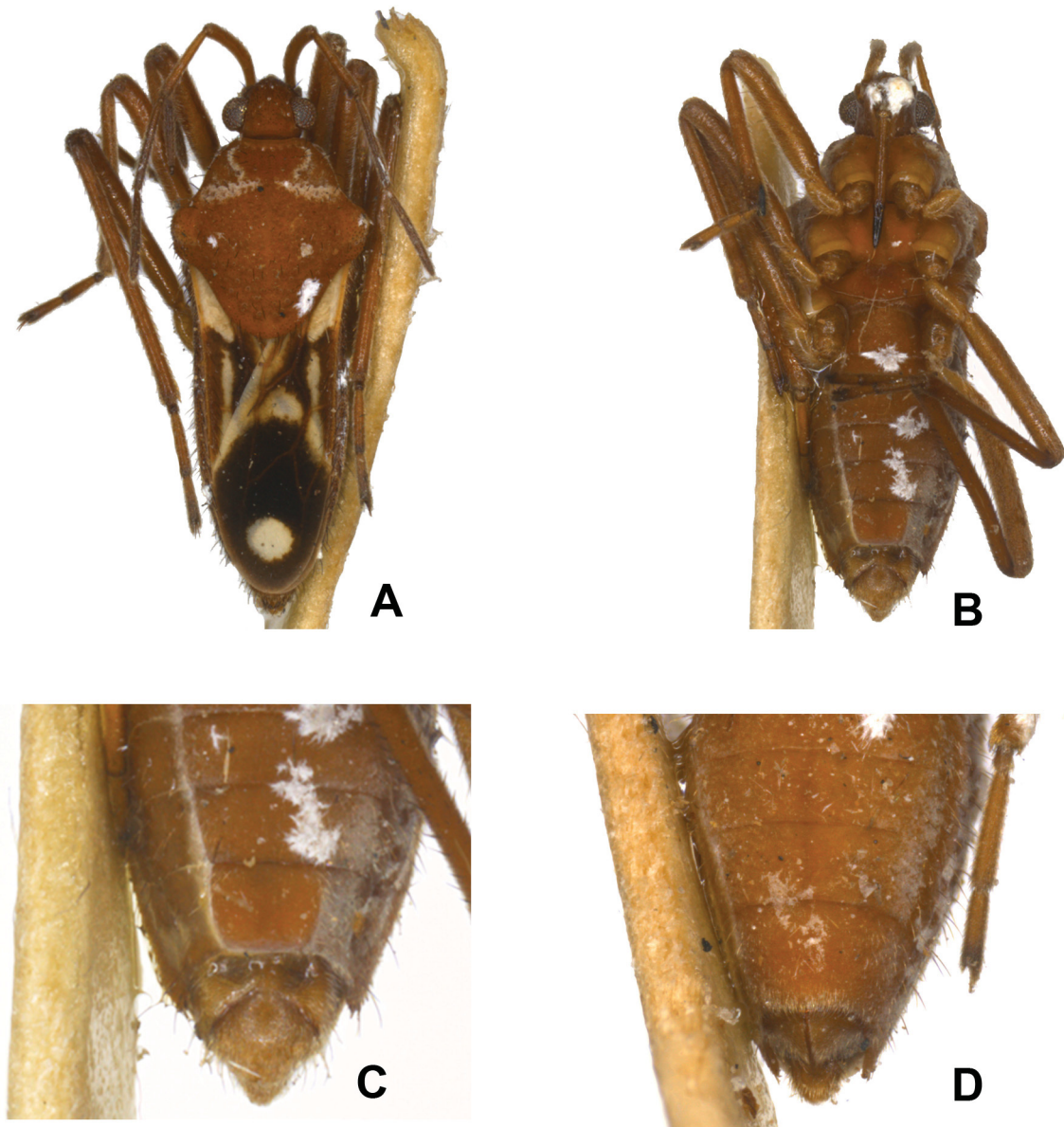


FIGURE 10. *Paravelia ornata* sp. nov. (A) Dorsal view of male holotype, (B) ventral view of male paratype, (C) apex of male abdomen, (D) apex of female abdomen.

Macropterous female. BL 3.95–4.25; HL 0.50–0.55; HW 0.75; ANT I 0.75–0.80, ANT II 0.60, ANT III 0.75, ANT IV 0.77; EYE 0.20; PL 1.50–1.60; PW 1.50–1.60; FORELEG: FEM 1.12–1.15, TIB 1.12–1.15, TAR I 0.10–0.11, TAR II 0.17, TAR III 0.22–0.30; MIDLEG: FEM 1.37–1.40, TIB 1.40–1.43, TAR I 0.10–0.11, TAR II 0.28–0.30, TAR III 0.32–0.36; HINDLEG: FEM 1.62–1.75, TIB 2.07–2.12, TAR I 0.11–0.12, TAR II 0.50–0.52, TAR III 0.40–0.42.

Color and general body structure as in macropterous male, but fore tibia without grasping comb; abdominal connexives more reflected; abdominal sternite VII cylindrical (Fig. 10D); black denticles on posterolateral region of segment VII, gonocoxae, and proctiger; and posterior angle of last connexival segment more developed (Fig. 12D).

Type-material. Holotype: Brazil, **Amazonas**: macropterous male (MZUSP), Tapuruquara, 00°24'01"S/ 65°01'59"W, Rio Negro, 26–27.XI.1962, (J. Bechyné). Paratypes: 3 macropterous males, 2 macropterous females (MZUSP), same data as holotype; 2 macropterous males (MZUSP), Barcelos, 01°00'00"S/ 62°58'00"W, 18–22.II.1963, (J. Bechyné); 1 macropterous male (DPIC), Manaus, Rio Tarumã-Mirim, 03°01'45"S/ 60°08'35"W, tributary of Rio Negro, 04.X.2002, (D.L.V. Pereira).

Distribution. This species has been recorded up to present in three localities, all situated in the Rio Negro basin (Fig. 21), Amazonas State, northern Brazil.

Etymology. *ornat-* (Latin), adorned; referring to the ornamental pattern of forewings, contrasting with the pronotal coloration.

Discussion. The new species can be distinguished from other species of the genus by the unusual arrangement of maculae on forewings; subtriangular pruinose areas on anterior lobe of pronotum (Fig. 10A); uniform orange to light orange brown coloration of head and pronotum; presence of minute black denticles on dorsal and ventral areas of head, on propleura, mesopleura, pronotum, connexives, and sides of genital segment I of male; absence of rounded punctations on venter of abdomen; absence of projections on the male sternite VII (Fig. 10C); and proctiger with small elevation near pygophore (Fig. 12B).

The unusual arrangement of forewings maculae makes *P. ornata* **sp. nov.** morphologically close to *P. confusa* (Hungerford, 1930) and *P. rotundanotata* (Hungerford, 1930). However, *P. confusa* has the macula of the subcostal area (= corium of Hungerford 1930a) continuing from the basal white macula, in contrast to *P. ornata* **sp. nov.** and *P. rotundanotata*, in which this macula does not start from the basal one (Figs 10A and 18B respectively). In addition, the male of *P. confusa* has projections on abdominal sternite VII, absent in the other two species.

The arrangement of forewings maculae in *P. rotundanotata* (Fig. 18B) is almost identical to *P. ornata* **sp. nov.** (Fig. 10A), only fainter. However, the new species can be promptly distinguished from *P. rotundanotata* in both sexes by the antennomere IV entirely brown (Fig. 10A), concolorous with the others. In *P. rotundanotata*, only short strips on the base and apex of the antennomere IV are dark brown, while the remainder of the segment is conspicuously lighter, white to pale yellow (Fig. 18B). The male of *P. ornata* **sp. nov.** bears a small projection on dorsal surface of proctiger (Fig. 12B), whereas in *P. rotundanotata* the projection looks like a horn, and has few black denticles on apex (Fig. 20D), which are absent in *P. ornata* **sp. nov.** The female of the new species has the posterolateral connexival apices of segment VII forming small right angles (Fig. 12D), not developed in *P. rotundanotata*.

***Paravelia polhemusi* Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.**

(Figs 11, 12E–F, 21)

Macropterous female. BL 6.22; HL 0.85; HW 1.05; ANT I 0.80, ANT II 0.66, ANT III 0.75, ANT IV 0.80; EYE 0.27; PL 2.50; PW 2.20; FORELEG: FEM 1.23, TIB 1.27, TAR I 0.09, TAR II 0.23, TAR III 0.43; MIDLEG: FEM 1.76, TIB 1.80, TAR I 0.13, TAR II 0.51, TAR III 0.55; HINDLEG: FEM 2.10, TIB 2.36, TAR I 0.13, TAR II 0.50, TAR III 0.46.

Head, antennomeres, pronotum, and sides of thorax dark brown to black. Eyes shining dark red. Antenniferous tubercles, articles I–III of rostrum, acetabula, coxae, trochanters, basal half of femora, exposed portions of connexives, abdominal and genital segments, light brown. Apex of article III and entire article IV of rostrum shining black. Forewings dark brown to black, with lighter veins; a large yellow macula at base, starting very close to humeral angle and surpassing apex of pronotum, and a rounded white macula centrally at apex (Fig. 11A). Prosternum brown, meso- and metasternum dark brown (Fig. 11B). Posterior half of femora, tibiae, and tarsi dark brown to black. A dark brown stripe on the area of the spiracles (Fig. 11C).

Head covered by brown setae, more concentrated in front of eyes, with three small rounded punctations near inner margin of eye, without black denticles. Antennae covered by short golden setae; antennomere I stoutest, curved outward; segment II less robust than I; III–IV of subequal width; segment IV fusiform (Fig. 11A). Ocular setae present. Rostrum reaching mesoacetabula.

Pronotum covered by short golden setae, with longitudinal median carina. Humeri slightly elevated. Posterior angle of pronotum almost sharp (Fig. 11A). Forewings reaching base of genital segments. Pro-, meso- and metasternum with few rounded punctations. Intersegmental area between meso- and metasternum centrally with

two pairs of small tubercles. Legs covered by golden setae. Small grasping comb present on distal fore tibia. Hind trochanter ventrally with 5–6 short obtuse spines. Hind femur dorsally with a row of 5–7 spines (Fig. 12F).

Connexives slightly elevated. Venter of abdomen covered by golden setae, without black denticles (Fig. 11B). Ventral apodeme visible, starting from posterior margin of sternite VI, and continuing almost to the anterior margin of this segment (best viewed in moist specimen). Superior portion of gonocoxae with black denticles. Posterior angle of last connexival segment poorly developed (Fig. 12E).

Type-material. Holotype: Brazil, **Mato Grosso**: macropterous female (DPIC), Nova Xavantina, Mario Viana Municipal Reserve (Bacaba Municipal Park), Córrego Bacaba, 14°43'14.80"S/ 52°21'35.63"W, 17.II.2004 (S.O. Pagioro).

Distribution. Only the holotype, collected in the Córrego Bacaba (Fig. 21), central-western Brazil, is known up to the present.

Etymology. Named in honor of Dr. Dan A. Polhemus (Honolulu, Hawaii, USA) in recognition to his contributions to the taxonomy of aquatic and semiaquatic Heteroptera.

Discussion. The new species can be distinguished from other species of the genus by the color pattern, and shape of maculae on forewings (Fig. 11A); length of body (6.22 mm); dark coloration of most parts of the body, contrasting with the light brown of abdomen (Fig. 11C); and by the presence of small obtuse spines on hind trochanter and a dorsal row of spines on hind femur (Fig. 12F).

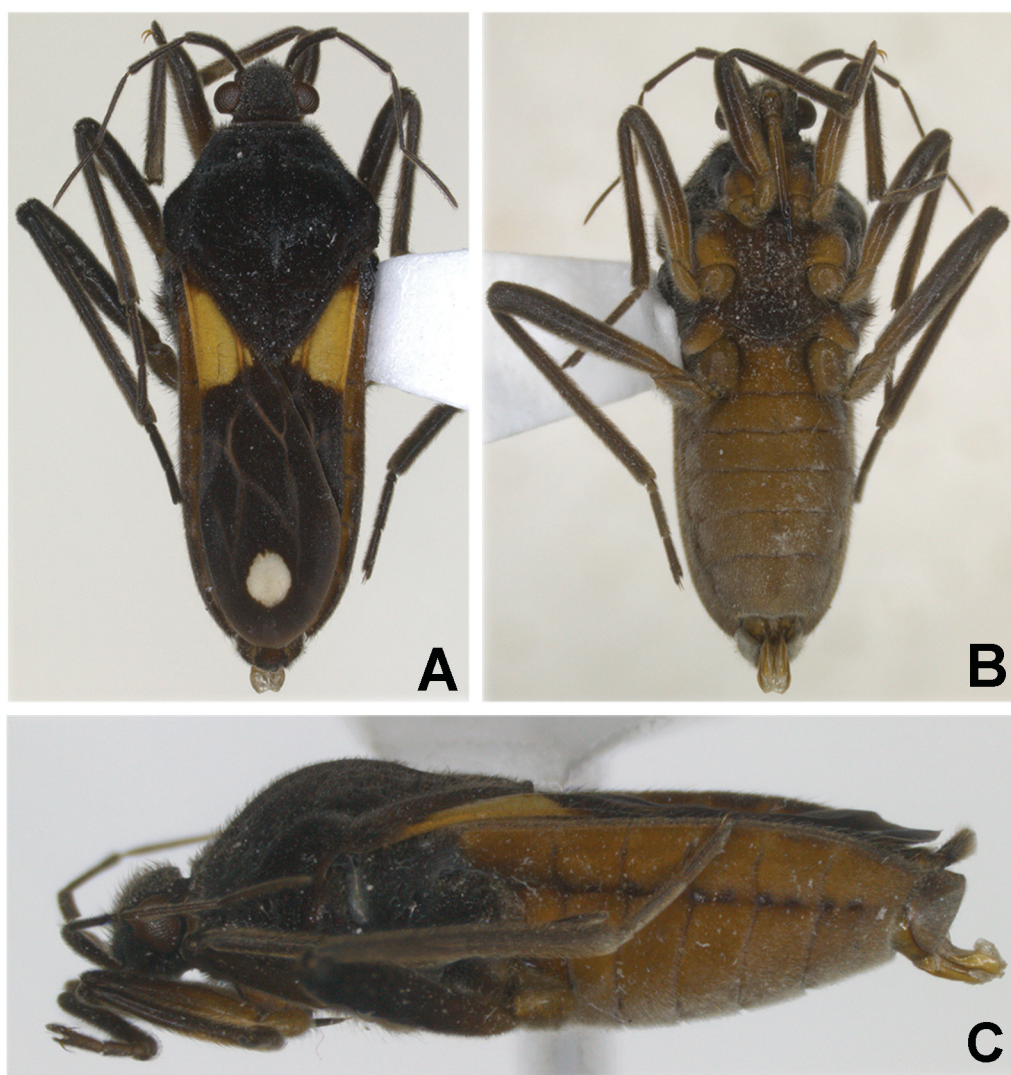


FIGURE 11. *Paravelia polhemusi* sp. nov. Female holotype, (A) dorsal view, (B) ventral view, (C) lateral view.

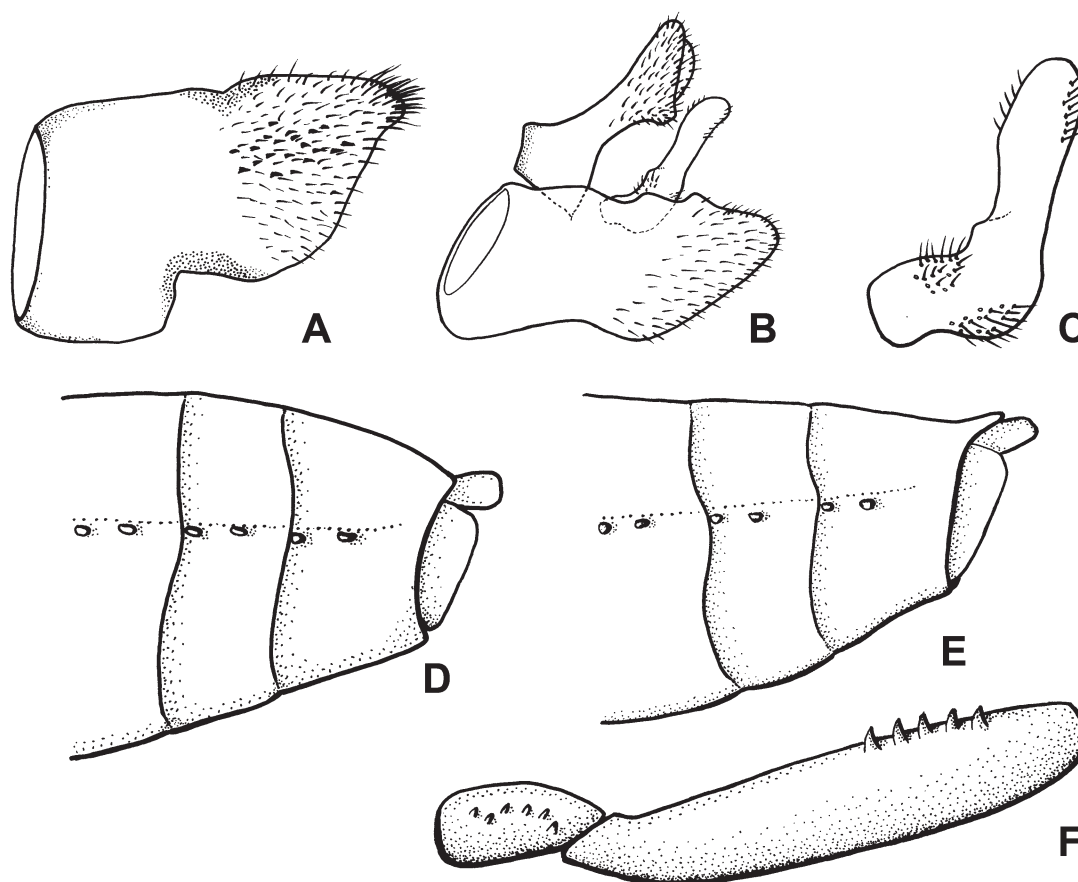


FIGURE 12. *Paravelia ornata* **sp. nov.** (A) Lateral view of first genital segment of male, (B) lateral view of genital capsule of male, (C) lateral view of paramere, (D) lateral view of female abdomen. *Paravelia polhemusi* **sp. nov.** (E) Lateral view of female abdomen, (F) ventral view of hind femur of female.

The length of the body, dark coloration of head, pronotum and legs, and yellow coloration of the basal macula of forewing, makes *P. polhemusi* **sp. nov.** morphologically close to *P. basalis*. However, *P. polhemusi* **sp. nov.** has the yellow macula lighter, and apical macula rounded (Fig. 11A), with small spines on posterior trochanter and spines on posterior femur (Fig. 12F), whereas *P. basalis* has the yellow color of basal macula darker, apical macula elongated and narrow, and spines on posterior trochanter and femur are absent (Figs 13A–B).

New records and notes

Paravelia basalis (Spinola, 1837)

(Figs 13A–B)

- Velia basalis* Spinola, 1837: 66. [Original description]
Velia bicolor Blanchard, 1843: 218. [Original description]
Velia brasiliensis Herrich-Schäffer, 1850: 76. [Original description]
Velia brasiliensis: Stål 1860, 82. [*V. bicolor* junior-synonym of *V. brasiliensis*]
Velia basalis: Mayr 1866, 180. [*V. brasiliensis* junior-synonym of *V. basalis*]
Paravelia basalis: Breddin 1898, 160. [Description of *Paravelia*; new combination]
Paravelia basalis: Kirkaldy 1899, 505. [New records]
Velia basalis: Hungerford 1929a, 761. [*Velia basalis* group]
Paravelia basalis: Polhemus 1976, 512. [New combination; checklist]
Paravelia basalis: Moreira *et al.* 2011b, 20. [Checklist]
Paravelia basalis: Moreira & Barbosa 2011, 307. [New records]
Paravelia basalis: Heckman 2011, 221. [Identification key]
Paravelia basalis: Moreira *et al.* 2012, 154. [New records]

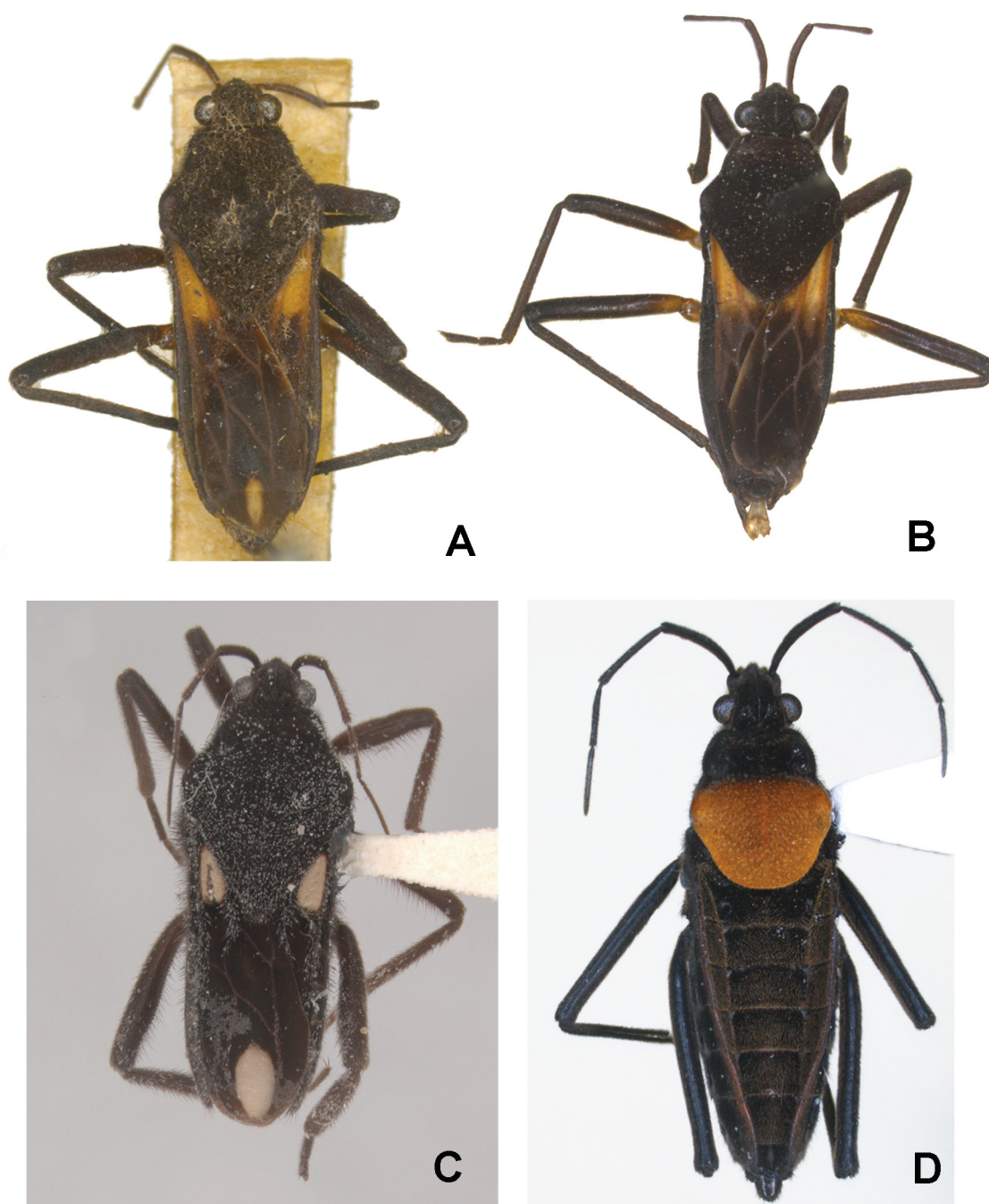


FIGURE 13. Dorsal view, (A) *Paravelia basalis* (with apical macula), (B) *P. basalis* (without apical macula), (C) *P. biae* (holotype), (D) *P. boliviana* (apterous).

Macropterous male. BL 6.30–6.50; HL 0.85; HW 1.15; ANT I 1.05, ANT II 0.95, ANT III lost, ANT IV lost; EYE 0.33; PL 2.60–2.65; PW 2.21–2.30. **Macropterous female.** BL 6.20; HL 0.85; HW 1.15; ANT I 1.03, ANT II 0.90, ANT III lost, ANT IV lost; EYE 0.33; PL 2.65; PW 2.30.

Diagnosis. Head, pronotum, almost entire femur and tibiae blackish. Forewing with a basal yellow macula starting from humeral angle and ending at posterior margin of pronotum; in most specimens also an apical narrow, elongated white macula (Fig. 13A). Legs without spines. Male abdominal sternite VII posteriorly with a pair of distinct and slightly divergent projections.

Discussion. The variation in the presence of the apical white macula (Figs 13A–B) has been observed in *P. basalis*, and previously mentioned for *P. itatiayana* by Drake (1951). After comparing specimens of both forms of wing marking, it was not possible to detect any other morphological differences between them, which led to

their assignment as the same species. *Paravelia basalis* is similar to *P. polhemusi* **sp. nov.** (Fig. 11), but can be separated from it by the more elongated shape of the apical macula of forewings (when present), and by the absence of spines on hind femur, which are present in *P. polhemusi* **sp. nov.**

Material examined. Brazil, **Minas Gerais:** 1 macropterous male (DPIC), Brumadinho, Retiro das Pedras, 20°04'S/ 44°00'W, 01.II.2004, (G.J.C. Vianna). **Espírito Santo:** 2 macropterous male, 2 macropterous females (MZUSP), Santa Teresa, São Lourenço Waterfall, moist moss, 02.XI.1944, (Schubart); 1 macropterous male, 1 macropterous female (DPIC), Espir.[ito] Santo, only information on the label [first record from Espírito Santo State]. **Rio de Janeiro:** 1 macropterous female (INPA) [specimen without apical macula], Rio de Janeiro, Tijuca, II.1940, (Leoberto). **São Paulo:** 1 macropterous male, 2 macropterous females (MZUSP), Campos do Jordão, 1906, (Luederwaldt) [same material examined by Moreira & Barbosa (2011)].

***Paravelia biae* Spangler, 1989**

(Fig. 13C)

Paravelia biae Spangler, 1989: 360. [Original description]

Paravelia biae: Moreira *et al.* 2011b, 20. [Checklist]

Paravelia biae: Heckman 2011, 229. [Identification key]

Macropterous male. BL 6.20–6.90; HL 0.80–0.85; HW 1.20–1.25; ANT I 1.00–1.05, ANT II 0.82–0.85, ANT III 0.80, ANT IV 0.90–0.95; EYE 0.35; PL 3.00–3.05; PW 2.50–2.55; FORELEG: FEM 1.60–1.70, TIB 1.60–1.65, TAR I 0.10, TAR II 0.30–0.35, TAR III 0.50–0.55; MIDLEG: FEM 1.95, TIB 2.15, TAR I 0.09–0.10, TAR II 0.60–0.65, TAR III 0.60–0.65; HINDLEG: FEM 2.60–2.65, TIB 3.00–3.05, TAR I 0.10–0.13, TAR II 0.67–0.72, TAR III 0.55–0.57. **Macropterous female.** BL 6.72–6.90; HL 0.87–0.90; HW 1.22–1.25; ANT I 0.95–1.00, ANT II 0.80–0.85, ANT III 0.75–0.85, ANT IV 1.00–1.05; EYE 0.35; PL 3.00; PW 2.50; FORELEG: FEM 1.60–1.75, TIB 1.55–1.65, TAR I 0.10, TAR II 0.30, TAR III 0.50–0.55; MIDLEG: FEM 2.00–2.05, TIB 2.10–2.15, TAR I 0.08–0.10, TAR II 0.55–0.60, TAR III 0.55–0.60; HINDLEG: FEM 2.30–2.50, TIB 2.90–3.00, TAR I 0.10–0.12, TAR II 0.55–0.70, TAR III 0.55–0.60.

Diagnosis. Both sexes with general color of body and appendages blackish, except base of rostrum yellowish brown. Pronotum with posterior angle terminating in a process (similar to Fig. 3F, but slightly more developed). Forewing with a basal white macula, not starting from humeral angle and ending at posterior margin of pronotum; on apex a large oval white macula, almost reaching posterior margin of wings (Fig. 13C). Male hind femur with a row of small teeth on inner surface, absent in female. Male without projections on abdominal sternite VII, but with a strong gibosity on each side of the posterior margin of this segment. Male proctiger without dorsal elevation. Paramere anteriorly notched on dorsal surface, with rounded apex.

Discussion. Described from the macropterous form, and previously recorded only from the type locality in Pará State. It is herein recorded for the first time from Rondônia. Spangler (1989) mentions that *P. biae* is similar to *P. platensis* (Berg, 1883) (Fig. 19A) and *P. williamsi* (Hungerford, 1930) (Figs 19C–D). However, they can be readily distinguished by body color, shape of forewing maculae, posterior angle of pronotum, and male abdominal sternite VII.

Type-material examined. Holotype: Brazil, **Pará:** macropterous male (MZUSP), Altamira, Rio Xingu, 03°39'S/ 52°22'W, 10.X.1986, (P.J. Spangler & O. Flint). Paratypes: 6 macropterous males, 6 macropterous females (MZUSP), 1 macropterous male, 1 macropterous female (INPA), same data as holotype.

Additional material examined. Brazil, **Rondônia:** 1 macropterous male, 1 macropterous female (MZUSP), Costa Marques, 12°26'42"S/ 64°13'38"W, Forte Príncipe da Beira, 19.XI–03.XII.1967, (G.R. Kloss) [First record from Rondônia State].

***Paravelia boliviana* Breddin, 1898**

(Fig. 13D)

Paravelia boliviana Breddin, 1898: 160. [Original description]

Velia boliviana: Hungerford 1930b, 120. [*Velia inveruglas* group]

Velia boliviana: Drake and Harris 1938, 97. [Redescription]
Paravelia boliviana: Polhemus 1976, 512. [Checklist]
Paravelia boliviana: Heckman 2011, 224. [Identification key]

Apterous female. BL 8.45; HL 1.30; HW 1.41; ANT I 1.55, ANT II 1.25, ANT III 1.00, ANT IV 1.15; EYE 0.40; PL 2.45; PW 2.25; FORELEG: FEM 2.60, TIB 2.50, TAR I 0.15, TAR II 0.37, TAR III 0.45; MIDLEG: FEM 3.15, TIB 3.40, TAR I 0.15, TAR II 0.57, TAR III 0.65; HINDLEG: FEM 3.75, TIB 4.95, TAR I 0.20, TAR II 1.00, TAR III 0.80.

Diagnosis. General body color blackish, except for orange posterior lobe of pronotum (Fig. 13D). Male proctiger with a pair of median dark brown expansions. Paramere long, hirsute on base, apically curved. Female connexives elevated, with segments VI–VII reflected over abdomen, and posterior angle of segment VII well-developed, turned inside and almost touching each other centrally.

Discussion. Known from apterous and macropterous forms, being one of the largest species of the genus, attaining 9.00 mm in some specimens. It can be separated from other large species with body length over 8.00 mm [*P. albotrimaculata* (Kirkaldy, 1899), *P. columbiensis* (Hungerford, 1930), *P. daza* Padilla-Gil & Moreira, 2011, *P. flavomarginata* (Hungerford, 1930) and *P. osborniana* (Kirkaldy, 1909)] mainly by the orange coloration of the posterior lobe of pronotum (Fig. 13D).

Material examined. Peru, **Cusco**: 1 apterous female, 4 nymphs (DZRJ), Upispata, Río Puica, 2879 m a.s.l., 30.VIII.2012, (D. Takiya & A.P.M. Santos) [first record from Cusco Region].

***Paravelia bullialata* Polhemus & Polhemus, 1984**

(Figs 14A, 16A)

Paravelia bullialata Polhemus & Polhemus, 1984a: 342. [Original description]
Paravelia bullialata: Pereira & Melo 2007, 645. [New records]
Paravelia bullialata: Moreira *et al.* 2011b, 20. [Checklist]
Paravelia bullialata: Heckman 2011, 234. [Identification key]
Paravelia bullialata: Rodrigues *et al.* 2012, 911. [New records]

Diagnosis. Male. BL 4.00, PW 1.32. Female. BL 3.52, PW 1.32 mm. General body color brown to orange brown; antennae and legs yellowish brown, with brown areas. Pronotum with irregular pruinose areas between anterior and posterior lobes, and another stripe adjacent to apex of posterior lobe (Fig. 14A). Forewing with a structure similar to bubble-sacs, starting from humeral angle and slightly passing posterior margin of pronotum; medially with four irregular whitish areas; at apex with a large irregular yellowish white area (Fig. 14A). Male proctiger without projections, at most with a slight anterior elevation. Paramere elongated, slightly curved centrally, with rounded apex (Fig. 16A).

Discussion. Known only from the macropterous form, being easily identified by the unique structure on the base of forewings, similar to a bubble-sac with eight transverse sections (Fig. 14A).

Material examined. Brazil, **Amazonas**: 1 macropterous male, 1 macropterous female (INPA), Careiro da Várzea, Ramal do Cobra, unnamed stream, 21.VI.2011, (H.D.D. Rodrigues & A.M.O. Pes); 1 macropterous male (DPIC), Presidente Figueiredo, BR-174, Km 110, Igarapé Camarão, 01°01'05"S/ 60°02'02"W, (D.L.V. Pereira); 3 macropterous females (DPIC), Presidente Figueiredo, Igarapé Maroca, 02°00'58"S/ 59°51'33"W, 11.X.2002, (D.L.V. Pereira); 3 macropterous males, 5 macropterous females (INPA), Presidente Figueiredo, Maroca Waterfall, 02°01'S/ 59°49'W, 18.VIII.2011, (H.D.D. Rodrigues).

***Paravelia capillata* (Drake & Harris)**

(Figs 14B, 16B–C)

Velia capillata Drake & Harris, 1933:45. [Original description]
Velia capitata [sic]: Drake 1957, 138. [*P. cognata* elevated to specific level]
Paravelia capillata: Polhemus 1976, 512. [New combination; checklist]
Paravelia capillata: Moreira *et al.* 2011b, 20. [Checklist]

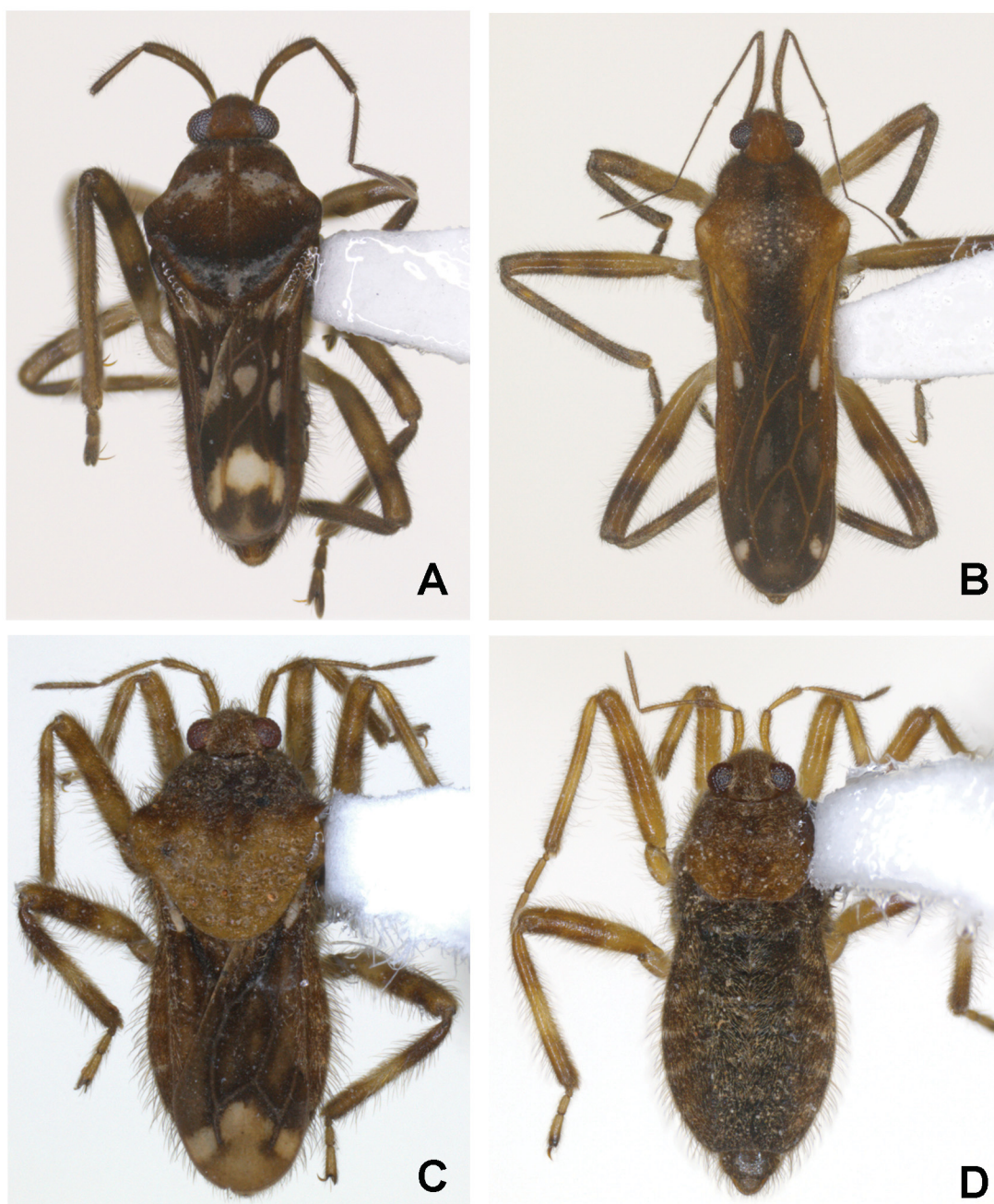


FIGURE 14. Dorsal view, (A) *Paravelia bullialata*, (B) *P. capillata*, (C) *P. capixaba* (macropterous), (D) *P. capixaba* (apterous).

Macropterous male. BL 4.95; HL 0.75; HW 0.75; ANT I 0.96, ANT II 0.85, ANT III 0.93, ANT IV 0.88; EYE 0.25; PL 1.70; PW 1.60; FORELEG: FEM 1.28, TIB 1.25, TAR I 0.10, TAR II 0.12, TAR III 0.30; MIDLEG: FEM 1.82, TIB 1.75, TAR I 0.10, TAR II 0.27, TAR III 0.33; HINDLEG: FEM 2.10, TIB 1.93, TAR I 0.10, TAR II 0.37, TAR III 0.40. **Macropterous female.** BL 4.55; HL 0.75; HW 0.71; ANT I 0.92, ANT II 0.82, ANT III 0.88, ANT IV 0.87; EYE 0.20; PL 1.55; PW 1.50; FORELEG: FEM 1.30, TIB 1.21, TAR I 0.10, TAR II 0.12, TAR III 0.27; MIDLEG: FEM 1.77, TIB 1.73, TAR I 0.10, TAR II 0.25, TAR III 0.30; HINDLEG: FEM 1.92, TIB 1.87, TAR I 0.11, TAR II 0.37, TAR III 0.40.

Diagnosis. Head brown to orange brown. Pronotum brownish, with a median darker band. Forewings dark brown, with costal margin and veins lighter; a whitish basal macula, elongated and narrow, situated below the posterior margin of pronotum; pruinosity between cells; at apex another pair of rounded whitish maculae (Fig. 14B). Acetabula, coxae, trochanters, and basal half of femora yellowish; remainder of legs brown with darker

areas. Body hirsute, without minute black denticle. Anterior lobe of pronotum without pubescence or pruinosity. Tibiae on inner surface with rounded darker denticles; hind femur without spines. Abdominal sternite VII of male with posterior margin slightly excavated medially, without projections or lobes. Genital segment I of male with posterior margin slightly concave medially, and long dark setae. Paramere elongated, narrow, with flattened and rounded apex (Figs 16B–C).

Discussion. This species is known only by the macropterous form, and morphologically similar to *P. cognata* (Drake & Harris, 1933), by pilosity and color of the body, and maculae pattern on the forewings. These species are differentiated by the size (*P. capillata* 4.20–4.95; *P. cognata* 5.50) and presence of denticles on inner margins of tibiae in *P. capillata*, absent in *P. cognata*.

Material examined. Brazil, **Mato Grosso:** 1 macropterous male, 1 macropterous female (MZUSP), Nova Xavantina, Rio Antártico basin, Córrego Bacaba, 14°43'10.5"S/ 52°21'35.07"W, 04.VII.2011, (N.F.S. Giehl & P.V.B. Fonseca).

***Paravelia capixaba* Moreira, Nessimian & Rúdio, 2010**

(Figs 14C–D, 16D)

Paravelia capixaba Moreira, Nessimian & Rúdio, 2010 (in Moreira *et al.* 2010): 2767. [Original description]

Paravelia capixaba: Moreira *et al.* 2011a, 661. [New records]

Paravelia capixaba: Moreira & Campos 2012, 545. [New records]

Paravelia capixaba: Rodrigues *et al.* 2012, 911. [New records]

Macropterous male. BL 3.25; HL 0.40; HW 0.61; ANT I 0.41, ANT II 0.30, ANT III 0.45, ANT IV 0.46; EYE 0.15; PL 1.25; PW 1.45; FORELEG: FEM 0.82, TIB 0.75, TAR I 0.05, TAR II 0.06, TAR III 0.19; MIDLEG: FEM 1.10, TIB 1.10, TAR I 0.07, TAR II 0.22, TAR III 0.27; HINDLEG: FEM 1.07, TIB 1.15, TAR I 0.07, TAR II 0.12, TAR III 0.25.

The macropterous form (Fig. 14C) is similar to the apterous form (Fig. 14D), except for the wider and longer pronotum, with humeral angles slightly elevated; anterior half dark brown, posterior half light brown; presence of longitudinal median carina, more evident on anterior half. Forewings reaching apex of abdomen, with only part of connexives exposed; dark brown, with veins and areas between cells lighter; a longitudinal white macula at base, starting from humeral angle and not surpassing posterior margin of pronotum; apical macula wide, whitish, covering entire apical portion of wing, except veins (Fig. 14C).

Diagnosis. Body and legs hirsute; general color brownish, with intersegmental areas of connexives lighter; legs yellowish brown; femora with a basal and an apical brownish area; tibiae with a median and an apical brownish area (Figs 14 C–D). Venter of tibiae with rows of small black denticles. Intersegmental region between meso- and metasternum without small tubercles. Hind femur without spines or denticles. Male proctiger without dorsal expansions, with lateral margins reflected upward, forming an acute, dark projection (Fig. 16D).

Discussion. This species was described from Espírito Santo State, Brazil, and later recorded from Amazonas, Pará and Minas Gerais States. Until now, the apterous form was the only one known, and the macropterous form is herein recorded and described for the first time. The species is easily recognized by the small body densely covered by long setae.

Material examined. Brazil, **Minas Gerais:** 1 apterous male (DPIC), Januária, São Joaquim, Barragem, 29.X.2009, (G.J.C. Vianna); 1 macropterous male (DPIC), same data, except Córrego dos Coxos, 27.XI.1997, (A.L. Melo).

***Paravelia conata* (Hungerford, 1929)**

(Figs 15A, 16E)

Velia conata Hungerford, 1929d: 199. [Original description]

Velia conata: Hungerford 1929a: 760. [Figure of male paramere]

Paravelia conata: Polhemus 1976, 512. [New combination; checklist]

Paravelia conata: Moreira *et al.* 2011b, 20. [Checklist]

Paravelia conata: Heckman 2011, 226. [Identification key]

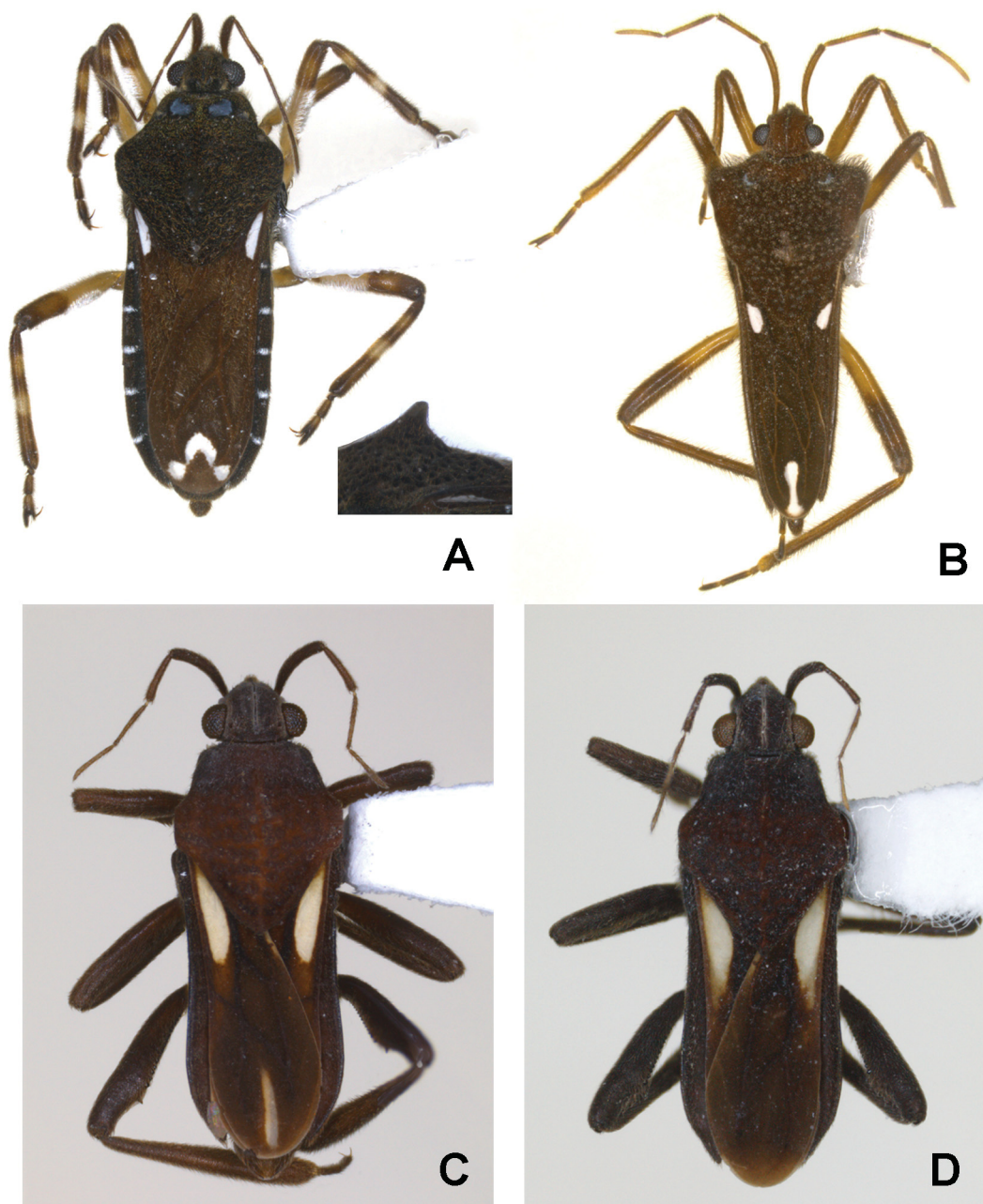


FIGURE 15. Dorsal view, (A) *Paravelia conata* (detail of conical process of pronotum in lateral view), (B) *P. dilatata* (macropterous male), (C) *P. itatiayana* (with apical macula), (D) *P. itatiayana* (without apical macula).

Macropterous male. BL 5.50; HL 0.65–0.67; HW 0.90; ANT I 0.59–0.62, ANT II 0.65–0.67, ANT III 0.74–0.77, ANT IV 0.67–0.70; EYE 0.25–0.27; PL 1.85–2.00; PW 1.92; FORELEG: FEM 1.20, TIB 1.05, TAR I 0.07, TAR II 0.10, TAR III 0.32–0.37; MIDLEG: FEM 1.45–1.50, TIB 1.45–1.60, TAR I 0.08, TAR II 0.25–0.27, TAR III 0.35–0.37; HINDLEG: FEM 1.60–1.62, TIB 1.65–1.72, TAR I 0.09, TAR II 0.25, TAR III 0.37–0.42.

Macropterous female. BL 5.12–5.57; HL 0.75; HW 0.87–0.90; ANT I 0.55–0.62, ANT II 0.62–0.67, ANT III 0.69–0.75, ANT IV 0.68–0.77; EYE 0.25–0.28; PL 1.85–2.00; PW 1.85–2.00; FORELEG: FEM 1.20, TIB 0.98–1.10, TAR I 0.05–0.07, TAR II 0.10–0.12, TAR III 0.30–0.33; MIDLEG: FEM 1.40–1.50, TIB 1.39–1.52, TAR I 0.08–0.10, TAR II 0.20–0.27, TAR III 0.35–0.37; HINDLEG: FEM 1.55–1.60, TIB 1.55–1.75, TAR I 0.08–0.10, TAR II 0.20–0.27, TAR III 0.35–0.42.

Diagnosis. General body color brown to dark brown; femora yellowish on basal half and brown on apical half; ventrally with silvery setae on basal half; tibiae brownish with a basal and an medial yellowish ring. Anterior lobe of pronotum with a pair of reniform whitish maculae; posterior lobe between humeral angles with a distinct conical

projection (Fig. 15A). Forewing with a basal white macula, elongated and narrow, starting from humeral angle and ending at posterior lobe of pronotum; at apex other three white maculae, the central being strongly convex and the lateral ones small and rounded (Fig. 15A). Small black denticles on inner surface of fore and hind tibiae. Intersegmental region between meso- and metasternum without small tubercles. Intersegmental region of connexives with silvery setae. Anterior margin of abdominal sternites III–VII with a transverse area without setae, becoming larger towards apex (as in Fig. 5B). First genital segment of male with posterior margin slightly convex dorsally. Male protigter without dorsal projection. Paramere without setae, narrow on base, tapering towards apex, which is rounded (Fig. 16E).

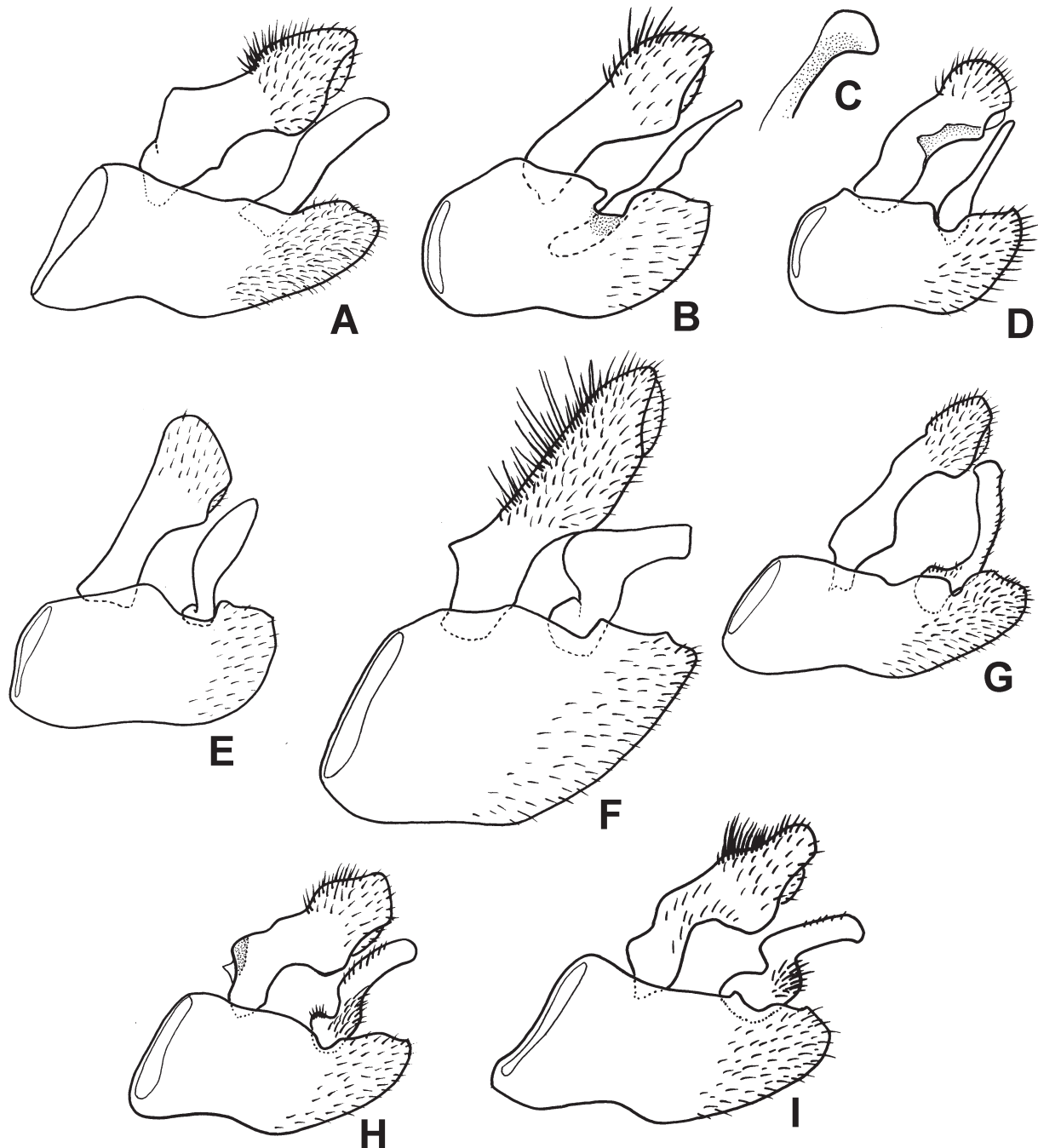


FIGURE 16. Lateral view of genital capsule of male, (A) *Paravelia bullialata*, (B) *P. capillata*, (C) apex of paramere of *P. capillata* in frontal view, (D) *P. capixaba*, (E) *P. conata*, (F) *P. dilatata*, (G) *P. foveata*, (H) *P. itatiayana*, (I) *P. lanemeloi*.

Discussion. This species is known only from the macropterous form and previously recorded only by the original description from French Guiana and Pará State, Brazil. Its geographical range is herein extended to central-western and southeastern Brazil. *P. conata* can be easily separated from all other species of the genus by the distinct conical projection of pronotum (Fig. 15A). It shares some characters with *P. bipunctata* **sp. nov.** (Fig. 5), like a pair of white maculae on anterior lobe of pronotum; small black denticles on fore and hind tibiae; absence of tubercles between meso- and metasternum; connexives with silvery setae; apical macula of forewings with similar shape; and transverse areas without setae on abdominal sternites. However, both are easily distinguished by the presence of a conical process on the pronotum of *P. conata*, absent in *P. bipunctata* **sp. nov.**

Material examined. All specimens macropterous. Brazil, **Amazonas:** 1 female (INPA), Barcelos, Serra do Aracá, Igarapé Ataiana, tributary of Rio Negro, 00°88'56.57"S/ 62°54'13.90"W, 10.VIII.2009, (N. Hamada, R.L. Ferreira-Keppeler, A.M.O. Pes & C.A.S. Azevêdo); 1 female (DPIC), Pitinga, Rio Pitinguinha, 17.VI.2001, (D.L.V. Pereira) [first record from Amazonas State]. **Mato Grosso:** 1 female (CZNX), Nova Xavantina, Córrego Cachoeirinha, second order, 14°50'50"S/ 52°24'22"W, 18.XI.2005, [1657], (H.R.S. Cabette *et al.*); 1 male (MZUSP), same data, except 06.XI.2007, [3733], (H.R.S. Cabette & K. Dias-Silva); 1 female (CZNX), same data, except third order, 14°50'33"S/ 52°21'34"W, 13.IX.2007, [3735], (K. Dias-Silva); 1 male (MZUSP), Nova Xavantina, Córrego Bacaba, ponto 1, 14°43'3.5"S/ 52°21'48.3"W, 09.VIII.2011, [5198], (N.F.S. Giehl & P.V.B. Fonseca); 1 female (CZNX), same data, except 31.VIII.2012, [6668]; 2 females (MZUSP), same data, except ponto 2, 14°43'10.5"S/ 52°21'35.07"W, 04.IX.2011, [5298]; 1 male (CZNX), same data, except 30.IX.2011, [5513]; 1 female (CZNX), same data, except ponto 3, 14°43'14.8"S/ 52°21'35.6"W, 30.IX.2011, [5524]; 1 female (CZNX), same data, except 29.VI.2012, [6714]; 1 female (CZNX), Córrego Buriti, 14°45'01.4"S/ 52°33'14.4"W, 27.III.2011, [4645], (N.F.S. Giehl) [first record from Mato Grosso State]. **Goiás:** 1 male, 1 female (ZUFG), Niquelândia, station 12, -14.497 S/ -48.658 W, 19.VI.2011, (K. Dias-Silva & B.T. Vieira) [first record from Goiás State]. **Espírito Santo:** 1 male (CZNC), Pinheiros, Córrego do Veado Biological Reserve, Tatu Assado, 20.I.2000, (F.F. Salles) [first record from Espírito Santo State].

***Paravelia dilatata* Polhemus & Polhemus, 1984**

(Figs 15B, 16F)

Paravelia dilatata Polhemus & Polhemus, 1984b: 503. [Original description]

Paravelia dilatata: Pereira & Melo 2007, 645. [New records]

Paravelia dilatata: Moreira *et al.* 2011b, 20. [Checklist]

Paravelia dilatata: Heckman 2011, 234. [Identification key]

Macropterous male. BL 6.50; HL 1.20; HW 1.10; ANT I 1.15, ANT II 0.95, ANT III 0.85, ANT IV 0.82; EYE 0.30; PL 2.60; PW 2.47; FORELEG: FEM 1.87, TIB 1.72, TAR I 0.12, TAR II 0.32, TAR III 0.42; MIDLEG: FEM 2.25, TIB 2.20, TAR I 0.12, TAR II 0.52, TAR III 0.45; HINDLEG: FEM 2.50, TIB 2.75, TAR I 0.12, TAR II 0.52, TAR III 0.46.

The macropterous form is herein recorded for the first time. It is similar to the brachypterous form in color and morphology, except for the wings reaching apex of abdomen, with a small oval white macula on basal portion, and one elongated, slightly constricted in the middle, white macula on apex (Fig. 15B). Dorsal surface of proctiger bearing long setae, with a small elevation at base; pygophore not emarginated on ventral surface; paramere strongly curved on dorsal surface, with truncated apex (Fig. 16F).

Diagnosis. This is the only species of the genus in which the pronotum of the male is strongly expanded anteriorly (Fig. 15B). Female without expansion of the anterior lobe of pronotum. In both sexes, antennomere IV pale to yellowish; abdominal sternites covered by rounded punctations, except on the sternite VII. Brachypterous wing with a very small elongated white macula at base, not starting from humeral angle; another very small and less conspicuous whitish macula at apex.

Discussion. *Paravelia dilatata* is known from both macropterous and brachypterous specimens, and in the latter form, both basal and apical maculae are very small. The authors, in the original description, omitted an important character of this species, which are the several suboval punctations on the abdominal sternites, described until the moment for five other species of the genus: *P. amapaensis* **sp. nov.**, *P. anta*, *P. bilobata* **sp. nov.**, *P. hungerfordi* and *P. foveata*. In addition to this character, the apical macula of the first four species also has a similar shape, all of them narrowed in the middle.

Material examined. Brazil, **Amazonas:** 1 macropterous male (INPA), Barcelos, Serra do Aracá, Igarapé Ataiana, tributary of Rio Negro, 00°88'56.57"S/ 62°54'13.90"W, 10.VIII.2009, (N. Hamada, R.L. Ferreira-Keppler, A.M.O. Pes & C.A.S. Azevêdo); 1 brachypterous female (MZUSP), Manaus, Adolpho Ducke Forest Reserve, temporary pool in trail of Igarapé Barro Branco, 02°53'S/ 59°58'W, 27.XI.2012, (U.G. Neiss).

***Paravelia foveata* Polhemus & Polhemus, 1984**
(Figs 16G, 17A)

Paravelia foveata Polhemus & Polhemus, 1984b: 499. [Original description]

Paravelia foveata: Moreira *et al.* 2011b, 20. [Checklist]

Paravelia foveata: Heckman 2011, 230. [Identification key]

Diagnosis. Male. BL 4.10, PL 1.50, PW 1.37. Female. BL 4.40, PL 1.55, PW 1.50. General body color brownish. Pleura and abdominal sternites covered by rounded punctations without setae. Anterior lobe of pronotum with a pair of whitish to pale yellow maculae. Forewing with a basal macula, starting from humeral angle and passing posterior margin of pronotum, convergent on distal half; on the sides of this macula, between radial and cubital vein, another small rounded white macula; pruinose areas between wing cells; on distal half, another pale white macula, with slightly concave posterior margin (Fig. 17A). Male proctiger without dorsal elevation. Paramere (Fig. 16G) medially narrow, with apex less rounded than that illustrated by Polhemus & Polhemus (1984b: 504).

Discussion. Described from the macropterous form and so far known only from the type-locality, in Amazonas State, Brazil. This species, like *P. amapaensis* **sp. nov.**, *P. anta*, *P. bilobata* **sp. nov.**, *P. dilatata*, and *P. hungerfordi*, has the thorax and abdomen covered by rounded or oval punctations. However, it can be easily differentiated from those by the pattern of maculae on anterior lobe of pronotum and on the forewings (Fig. 17A).

Material examined. Brazil, **Roraima:** 3 macropterous males, 1 macropterous female (INPA), Yanomami indigenous area, Serra de Surucucu, 02°49'53.78"N/ 63°38'19.78"W, unnamed stream, 26.XI.1991, (V. Py-Daniel & U. Barbosa) [first record from Roraima State].

***Paravelia itatiayana* (Drake, 1951)**
(Figs 15C–D, 16H)

Velia itatiayana Drake, 1951: 374. [Original description]

Paravelia itatiayana: Polhemus 1976, 512. [New combination; checklist]

Paravelia itatiayana: Moreira *et al.* 2011b, 21. [Checklist]

Paravelia itatiayana: Heckman 2011, 232. [Identification key]

Paravelia itatiayana: Moreira & Barbosa 2011, 307. [Habitat; new records; figure of male paramere]

Paravelia itatiayana: Moreira *et al.* 2012, 154. [New records]

Diagnosis. BL 3.85; PW 1.62. General body color dark brown to dark reddish brown. Forewing with a usually white elongated macula, starting from humeral angle and passing posterior margin of pronotum at about half its length; on apex a narrow elongated macula with length similar to the basal one, absent in some specimens (Figs 15C–D). Male hind femur with a row of small teeth on inner surface, followed by a more robust spine; hind tibia clavate. Female hind femur with 3–4 small spines; hind tibia not clavate. Male proctiger anteriorly with a small acute projection. Paramere elongated, slightly curved, with a small notch on dorsal surface near base, with rounded apex (Fig. 16H).

Discussion. This species inhabits water accumulated in bromeliads and the pattern of wing maculae is similar to that of *P. gabrielae* Moreira & Barbosa, 2011, another bromeliadicolous species. However, it differs from the latter by the absence of silvery stripes on anterior lobe of pronotum (Fig. 15C–D).

Material examined. Brazil, **Rio de Janeiro:** 1 macropterous male, 1 macropterous female (DZ RJ), Macaé, Ilha do Santana, bromeliad, 20.X.1986, (A.L. Carvalho); 1 macropterous male (DZ RJ), Mangaratiba, Rio das Pedras Ecological Reserve, bromeliad, 22.V.2005, (D. Kaplan, M.T.A. Santos, L. Villaverde); 2 macropterous males, 4 macropterous females (DZ RJ), Maricá, bromeliad, 1977, (C. Ostrovski) [same material examined by Moreira *et al.* (2012)].

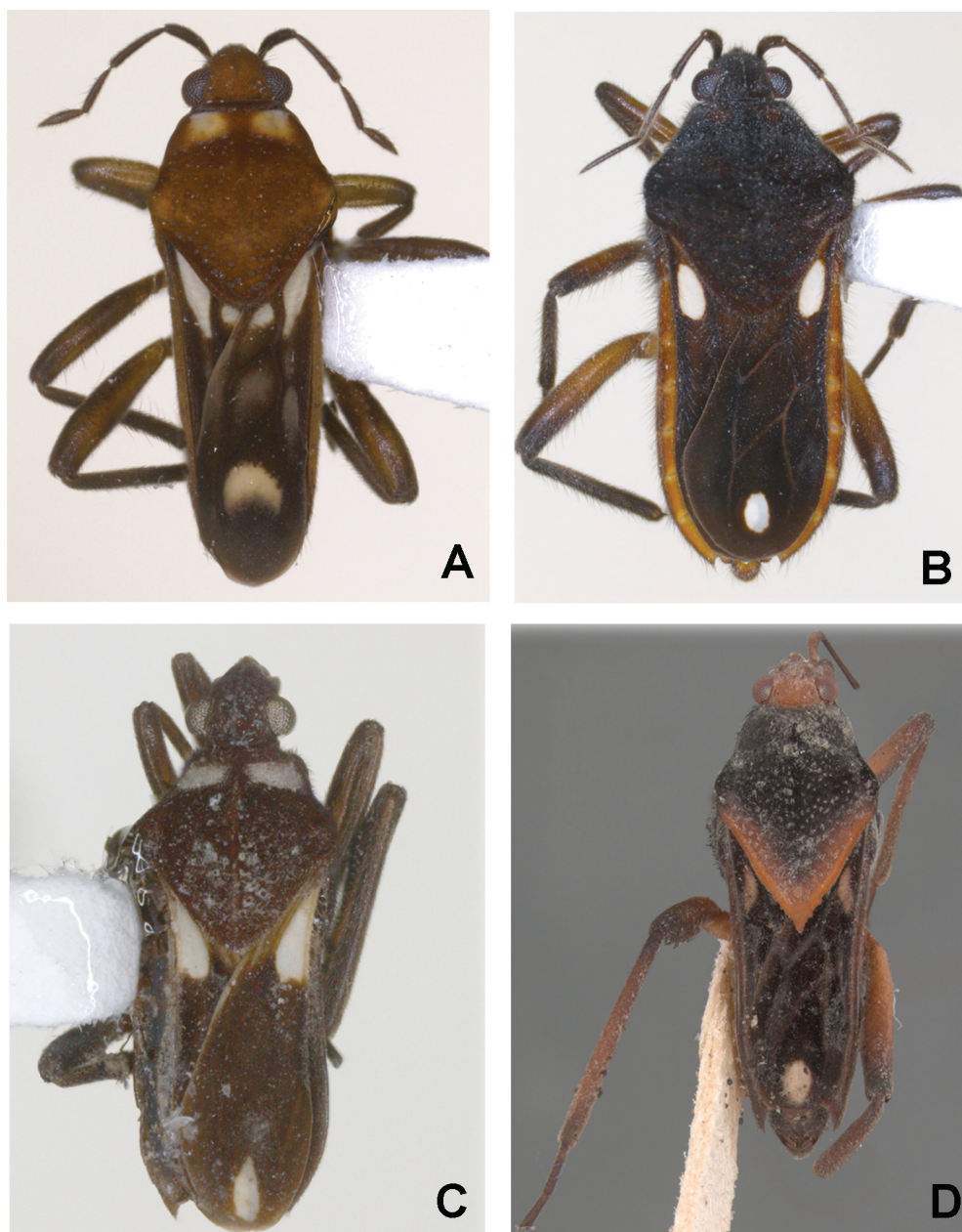


FIGURE 17. Dorsal view, (A) *Paravelia foveata*, (B) *P. lanemeloï* (paratype), (C) *P. manausana*, (D) *P. nieseri* (holotype).

***Paravelia lanemeloï* Moreira & Barbosa, 2012**
(Figs 16I, 17B)

Paravelia lanemeloï Moreira & Barbosa, 2012: 59. [Original description]

Diagnosis. Male. BL 4.95–5.10, PW 2.03. Female. BL 5.15, PW 2.04–2.05. General body color dark brown; trochanters, basal half of femora, and exposed portion of connexives yellowish. Venter of head, central region of abdominal sternites II–VI, and posterolateral margins of sternite VII with small black denticles. Forewing with a basal oval white macula, not touching humeral angle and ending adjacent to posterior margin of pronotum; at apex another oval white macula, slightly smaller than basal macula (Fig. 17B). Male proctiger without dorsal projections. Paramere elongated, curved on basal half, with a small notch on dorsal surface near base, and rounded apex (Fig. 16I).

Discussion. This species was recently described based on the macropterous form, collected in regions above 1.000 m a.s.l of Minas Gerais State, Brazil, in the Espinhaço mountain range.

Type material examined. Paratypes: Brazil, **Minas Gerais**: 1 macropterous male, 2 macropterous females (DZRJ), Santana do Riacho, Alto do Palácio, temporary pool, 1.300–1.400 m a.s.l., 17.I.2009, (D. Takiya).

Additional material examined. Brazil, **Minas Gerais**: 1 macropterous female (DPIC), Serra do Cipó, Cardeal Mota, Travessão, 11.X.1998, (G.J.C. Vianna).

***Paravelia manausana* Polhemus & Polhemus, 1984**

(Figs 17C)

Paravelia manausana Polhemus & Polhemus, 1984a: 341. [Original description]

Paravelia manausana: Polhemus & Polhemus 1991, 207. [Habitat; identification key; new records]

Paravelia manausana: Moreira *et al.* 2011b, 21. [Checklist]

Paravelia manausana: Heckman 2011, 236. [Identification key]

Diagnosis. Male. BL 4.15, PW 1.60. Female. BL 4.10, PW 1.30. Body dark brown to black, without black denticles. Anterior lobe of pronotum with a pair of whitish subrectangular pubescent areas. Forewing with a basal whitish macula, starting from humeral angle and passing posterior margin of pronotum; at apex another suboval white macula, almost reaching posterior margin of wing (Fig. 17C). Hind femur with a row of small teeth on inner surface. Male hind tibia clavate. Male proctiger with an elevation on posterior half. Paramere elongated, with subtruncate apex.

Discussion. The only examined specimen is partly destroyed, which impeded the drawing of its genitalia; however, this structure was drawn by Polhemus & Polhemus (1991: 206, Figure 3). *Paravelia manausana* Polhemus & Polhemus, 1984, together with *P. itatiayana* Drake, 1951, *P. gabrielae*, and *P. recens* (Drake & Harris, 1935), are the Brazilian species recorded from water accumulated in bromeliads. It can be separated from those mainly by the body color, pattern of maculae of forewings (Fig. 17C), and shape of male paramere. Specimens of *P. recens* (Fig. 18A) and *P. manausana* can be collected on the same bromeliad and confounded at first sight when examined in alcohol. However, when dried, specimens present different coloration, which makes it easier to separate the two species.

Material examined. Brazil, **Amazonas**: 1 macropterous male (INPA), Manaus, Adolpho Ducke Forest Reserve, Acará, campinarana, in bromeliad, 03.X.2003, (S.R.S. Torreias, J. Fernandes & J. Vidal).

***Paravelia nieseri* Moreira & Barbosa, 2012**

(Figs 17D, 20A)

Paravelia nieseri Moreira & Barbosa, 2012: 61. [Original description]

Diagnosis. Male. BL 6.25–6.35, PW 2.06–2.26. Female. BL 6.10, PW 2.06. Head and posterior margin of pronotum orange to orange brown; remaining of body brown to dark brown; legs yellowish brown, with small basal area dark. Ventral region of head, anterior margin of prosternum, and posterior region of first genital segment of male with small black denticles. Posterior angle of pronotum acuminate (Fig. 17D). Forewing with a basal white macula, not starting from humeral angle and ending before posterior margin of pronotum; at apex another oval white macula near posterior margin of wing (Fig. 17D). Male hind trochanter with small denticles; male hind femur with a row of small teeth on basal 3/4, followed by two robust spines. Male abdominal sternite VII with a pair of acute projections on posterior margin. Female hind femur with a row of 4–6 small spines on distal half. Male proctiger with a distinct anterior elevation. Paramere with a slight dorsal notch near base and with truncate apex (Fig. 20A).

Discussion. This species was recently described and known only from the macropterous form. Males have a pair of projections on abdominal sternite VII, like *P. basalis*, *P. confusa*, *P. williamsi*, and *P. truxali* Polhemus & Polhemus, 1985. Its acuminate posterior angle of pronotum differentiates it from the first three species, in which the angle is rounded. Both *P. nieseri* and *P. truxali* have, besides acuminate posterior angle of pronotum,

coloration of head and part of pronotum orange, and the acute shape of projections of male sternite VII. However, in *P. nieseri* the pronotum is dark brown to black, with margins of posterior lobe orange; the paramere has a slight notch on basal dorsal surface; female hind femur has no denticles; whereas in *P. truxali* the pronotum is orange with anterior lobe, humeral angles, and a wide median stripe brownish; the paramere is slightly widened on the basal dorsal surface; and female hind femur has approximately seven black denticles on ventral surface. *Paravelia nieseri* was known only from the type-locality in the Serra do Caraça, Minas Gerais State, Brazil. Its geographical range is herein expanded to the Serra do Cipó, Retiro das Pedras, and Ouro Preto, all located above 1.300 m a.s.l. in Minas Gerais.

Type material examined. Holotype: Brazil, **Minas Gerais**: macropterous male (MZUSP), Serra do Caraça, XI.1961, (Kloss, Lenko, Martins & Silva). Paratypes: 2 macropterous males, 1 macropterous female (MZUSP), same data as holotype.

Additional material examined. Brazil, **Minas Gerais**: 2 macropterous males, 1 macropterous female (DPIC), Serra do Caraça, about 1.500 m a.s.l., 27.III.1999, (M.A. Horta); 2 macropterous females (DPIC), Serra do Cipó, Cardeal Mota, MG-010, Km-103, temporary pool, 08.III.1997, (A.L. Melo); 3 macropterous males, 5 macropterous females, 5 nymphs (DPIC), same data, except Km-105, 06.II.2000; 2 macropterous males, 3 macropterous females (DPIC), Serra do Cipó, 12.XII.1997, (A.L. Melo); 2 macropterous males, 1 macropterous female (DPIC), Brumadinho, Retiro das Pedras, 20°04'S/ 44°00'W, 14.IV.1999, (G.J.C. Vianna); 1 macropterous male, 1 macropterous female (DPIC), same data, except XI.1999; 2 macropterous females (DPIC), Ouro Preto, Estrada Real, Trilha do Chafariz, temporary pool in trail, 20°21'45.18"S/ 43°33'33.63"W, 1.427 m a.s.l., 05.IV.2010, (H.D.D. Rodrigues).

***Paravelia platensis* (Berg, 1883)**

(Figs 19A, 20B)

Velia platensis Berg, 1883: 117. [Original description]

Velia platensis: Río & Achával 1904, 364. [New records]

Velia platensis: Thaxter 1912, 194–195. [Association with Laboulbeniaceae]

Velia platensis: Pennington 1920, 31. [Checklist]

Velia platensis: Ruffinelli & Pirán 1959, 28. [New records]

Paravelia platensis: Polhemus 1976, 512. [New combination; checklist]

Paravelia platensis: Iglesias & Crespo 1999, 263. [Identification key]

Paravelia platensis: Mazzucconi & Bachmann 2003, 89. [New records; checklist]

Paravelia platensis: Mazzucconi *et al.* 2008, 66. [New records]

Paravelia platensis: Konopko *et al.* 2009, 277. [Identification key]

Paravelia platensis: Nanni *et al.* 2011, 32 [New records]

Paravelia platensis: Heckman 2011, 231. [Identification key]

Brachypterous male. BL 5.03; HL 0.60; HW 0.80; ANT I 0.72, ANT II 0.55, ANT III 0.67, ANT IV 0.77; EYE 0.20; PL 2.02; PW 1.80; FORELEG: FEM 1.27, TIB 1.33, TAR I 0.10, TAR II 0.20, TAR III 0.38; MIDLEG: FEM 1.62, TIB 1.75, TAR I 0.12, TAR II 0.55, TAR III 0.50; HINDLEG: FEM 1.87, TIB 2.17, TAR I 0.09, TAR II 0.47, TAR III 0.42.

Diagnosis. General body color brown to dark brown. Pronotum without maculae or pruinosity on anterior lobe. Forewings of brachypterous form leaving most of tergites and connexives VI–VII exposed; forewing dark brown with lighter veins, and a basal elongated white macula starting from humeral angle and ending adjacent to posterior margin of pronotum; at apex another white macula, small and oval, very close to the posterior margin of wing (Fig. 19A). Male abdominal sternites V–VII medially prominent and slightly flattened; male sternite VII with posterior margin slightly extended medially, with two lobes surrounding a central concavity. Paramere with many elongated setae on inner and outer surface, and subtruncate apex (Fig. 20B).

Discussion. Known from the brachypterous and macropterous forms, and previously recorded from Argentina and Uruguay. Herein the species is recorded for the first time from Brazil, based on material collected in São Paulo State.

Material examined. Brazil, **São Paulo**: 1 brachypterous male (DZRJ), São José do Barreiro, Serra da Bocaina National Park, pool 2, 21.V.2009, (D.S. Provete) [first record from Brazil].

***Paravelia recens* (Drake & Harris, 1935)**
(Figs 18A, 20C)

Velia recens Drake & Harris, 1935: 192. [Original description]

Velia recens: Drake & Maldonado-Capriles 1952, 47. [Habitat; new records]

Velia recens: Drake & Hussey 1954, 133. [Habitat; new records]

Paravelia recens: Polhemus 1976, 512. [New combination; checklist]

Paravelia recens: Polhemus & Polhemus 1991, 210. [Habitat; identification key; new records]

Paravelia recens: Nieser & Alkins-Koo 1991, 62. [Identification key; new records]

Paravelia recens: Pereira *et al.* 2007, 147. [Ecology]

Paravelia recens: Moreira *et al.* 2011b, 21. [Checklist]

Paravelia recens: Heckman 2011, 236. [Identification key]

Paravelia recens: Padilla-Gil & Moreira 2011, 23. [Identification key]

Paravelia recens: Padilla-Gil 2013, 501. [Identification key]

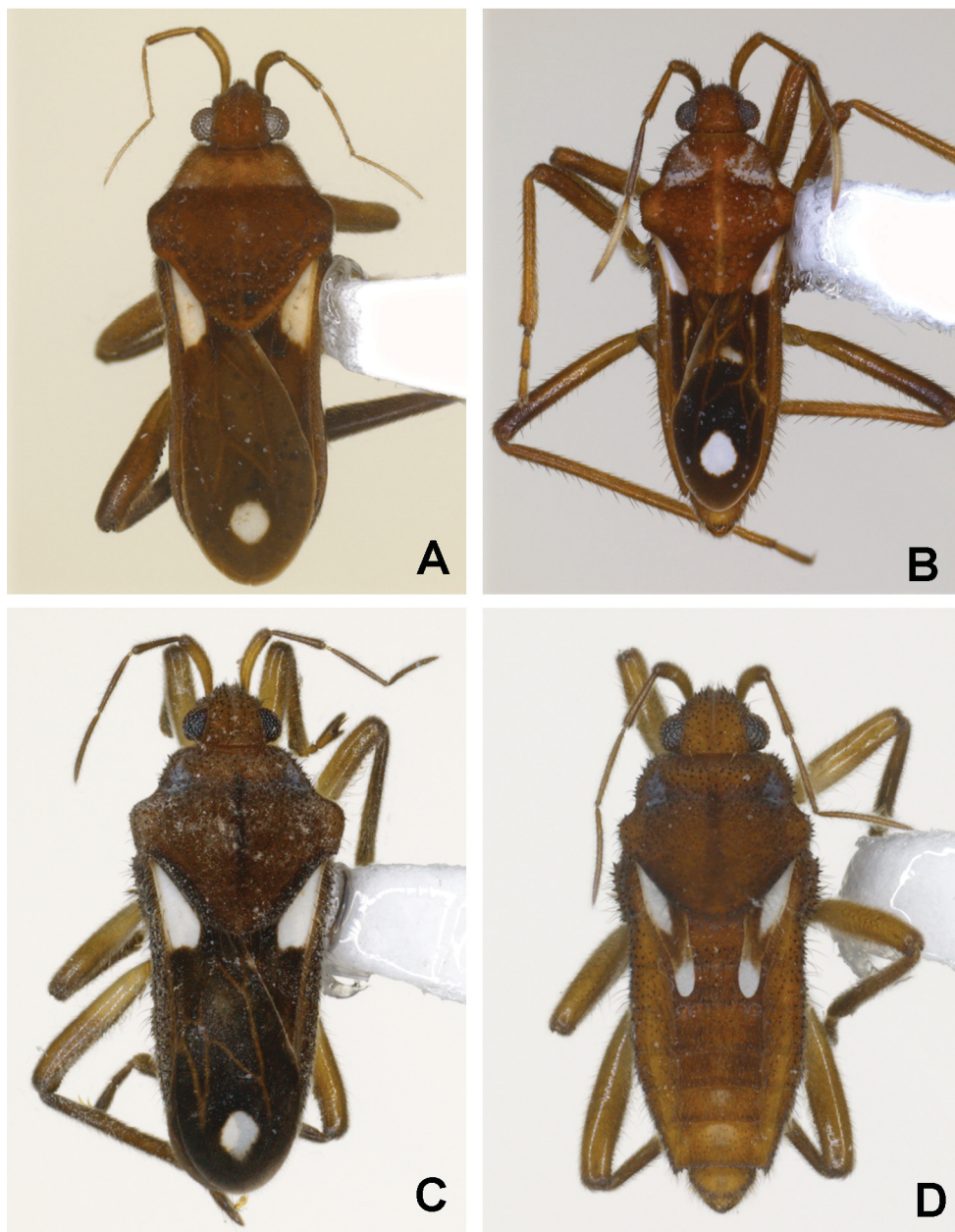


FIGURE 18. Dorsal view, (A) *Paravelia recens*, (B) *P. rotundanotata*, (C) *P. splendoris* (macropterous), (D) *P. splendoris* (micropterous).

Diagnosis. BL 3.50–3.95. General body color brownish; coxae, trochanters, and base of femora yellowish brown, remaining of legs brown. Pronotum with anterior lobe lighter, with or without a pair of lateral pruinose areas. Forewing dark brown, with a basal white macula starting from humeral angle and passing posterior margin of pronotum; at apex another rounded white macula (Fig. 18A). Male hind femur with a row of small teeth on inner margin through almost entire length. Male hind tibia clavate. Paramere with a basal dorsal notch, tapering towards apex (Fig. 20C).

Discussion. Despite being exclusive from the interior of bromeliads, this species has a wide geographical range, from Honduras to southeastern Brazil. It also shows a wide morphological variation among populations, which has led some researchers to identify it differently. Most of the specimens herein mentioned display shape of forewings maculae similar to those illustrated by Polhemus & Polhemus (1991). However, some specimens show white pruinosity on anterior lobe of pronotum, besides an oval-shaped apical macula on forewing. *Paravelia manausana* (Fig. 17C) is a similar species, from which *P. recens* differs by the brownish color, rounded apical macula of forewings, and tapering paramere (Fig. 20C), whereas in *P. manausana* the coloration is dark brown to black, the apical macula is suboval and almost reaches the posterior margin of wing, and the paramere does not taper towards apex, which is subtruncate distally.

Material examined. Brazil, **Amazonas:** 2 macropterous males (INPA), Manaus, Adolpho Ducke Forest Reserve, Acará, campinarana, in bromeliads, 12.V.2005, (S.R.S. Torreias & C. Menezes); 7 macropterous males, 7 macropterous females (INPA), same data, except 14.V.2003, (J. Oliveira, J. Vidal & J. Miranda). **Espírito Santo:** 1 macropterous male, 3 macropterous females (MNRJ), Aracruz, Santa Cruz, I.1975, (L.F. Reys) [first record from Espírito Santo State].

***Paravelia rotundanotata* (Hungerford, 1930)**

(Figs 18B, 20D)

Velia rotundanotata Hungerford, 1930a: 23. [Original description]

Paravelia rotundanotata: Polhemus 1976, 512. [New combination; checklist]

Paravelia rotundanotata: Moreira *et al.* 2011b, 21. [Checklist]

Paravelia rotundanotata: Heckman 2011, 228. [Identification key]

Macropterous male. BL 3.67–3.70; HL 0.52; HW 0.70; ANT I 0.62, ANT II 0.50, ANT III 0.63, ANT IV 0.76; EYE 0.20; PL 1.30–1.40; PW 1.25–1.30; FORELEG: FEM 1.07, TIB 1.02, TAR I 0.07, TAR II 0.17, TAR III 0.27; MIDLEG: FEM 1.17, TIB 1.25, TAR I 0.07, TAR II 0.25, TAR III 0.30; HINDLEG: FEM 1.50, TIB 1.87, TAR I 0.08, TAR II 0.50, TAR III 0.30. **Macropterous female.** BL 4.10–4.35; HL 0.55; HW 0.67; ANT I 0.75, ANT II 0.62, ANT III 0.75, ANT IV 0.85; EYE 0.20; PL 1.50; PW 1.52–1.50; FORELEG: FEM 1.17, TIB 1.15, TAR I 0.07, TAR II 0.17, TAR III 0.33; MIDLEG: FEM 1.40, TIB 1.50, TAR I 0.10, TAR II 0.30, TAR III 0.35; HINDLEG: FEM 1.75, TIB 2.20, TAR I 0.12, TAR II 0.55, TAR III 0.40.

Diagnosis. General coloration of body and antennae brown to orange brown, except for antennomere IV white to pale yellow centrally, with brown base and apex (Fig. 18B). Head, pronotum, connexives, and posterolateral margins of abdominal sternite VII covered by small black denticles. Pronotum with midline and humeral angles lighter; anterior lobe with a pair of subtriangular pruinose areas. Forewing with a basal white macula starting from humeral angle and ending adjacent to posterior margin of pronotum; in front of it another pale longitudinal stripe; on side, starting from cubital vein, another pale stripe surrounding the wing; at apex a rounded white macula (Fig. 18B). Male abdominal sternite VII centrally slightly flattened, without projections. Male proctiger with a distinct dorsal elevation on anterior half and small black denticles on apex. Paramere elongated with rounded apex (Fig. 20D). Female proctiger covered by small black denticles.

Discussion. This species was known so far from the records mentioned in the original description, La Plata in Argentina and in Minas Gerais State, Brazil. Mazzucconi (2000) cites that, despite the original record from La Plata, its occurrence in the region of Buenos Aires seemed doubtful, because it had never been collected there by local researchers. *Paravelia ornata* **sp. nov.** (Fig. 10) is a similar species, especially because of the resemblance of the forewing maculae, body color, and small black denticles covering great part of the body (see discussion on *P. ornata* **sp. nov.**).

Material examined. Brazil, **Mato Grosso:** 2 macropterous females (DPIC), Novo Santo Antônio, Rio São

João Grande, 11.VIII.2003, (S.O. Pagioro); 1 macropterous female (DPIC), same data, except 20.VI.2004 [first record from Mato Grosso State]. **Mato Grosso do Sul:** 3 macropterous males (DZRJ), Aquidauana, Rio Negro Farm, 04.IX.2007, (J.L. Nessimian) [first record from Mato Grosso do Sul State].

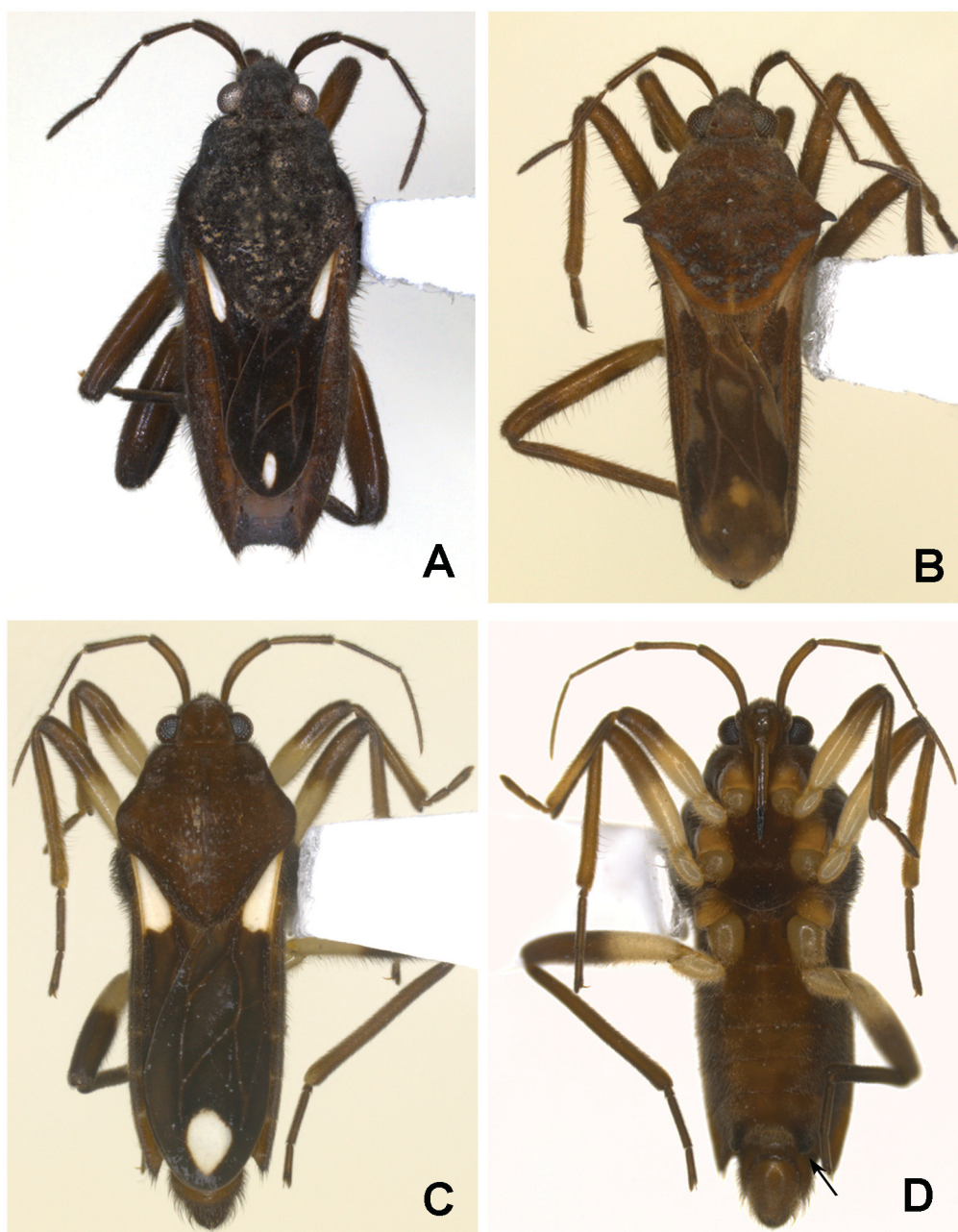


FIGURE 19. Dorsal view, (A) *Paravelia platensis* (brachypterous), (B) *P. spinifera*, (C) *P. williamsi*, (D) ventral view of *P. williamsi* (arrow indicates the projections on sternite VII of male).

***Paravelia spinifera* Polhemus & Polhemus, 1984**
(Figs 19B, 20E)

Paravelia spinifera Polhemus & Polhemus, 1984a: 341. [Original description]

Paravelia spinifera: Heckman 2011, 220. [Identification key]

Macropterous male. BL 3.85–3.90; HL 0.50–0.60; HW 0.70–0.71; ANT I 0.67–0.70, ANT II 0.47–0.50, ANT III 0.43–0.45, ANT IV 0.50–0.51; EYE 0.22–0.23; PL 1.32–1.37; PW 1.65–1.67; FORELEG: FEM 0.90–0.92, TIB 0.91–0.92, TAR I 0.07, TAR II 0.10–0.11, TAR III 0.32–0.37; MIDLEG: FEM 1.25, TIB 1.36–1.37, TAR I 0.07,

TAR II 0.16–0.18, TAR III 0.36–0.37; HINDLEG: FEM 1.46–1.50, TIB 1.62–1.65, TAR I 0.07, TAR II 0.17, TAR III 0.36–0.38. **Macropterous female.** BL 3.95; HL 0.50; HW 0.72–0.75; ANT I 0.67, ANT II 0.47–0.50, ANT III 0.43–0.45, ANT IV 0.50; EYE 0.23–0.25; PL 1.42; PW 1.61–1.65; FORELEG: FEM 0.87–0.92, TIB 0.90–0.92, TAR I 0.07, TAR II 0.10–0.11, TAR III 0.32–0.35; MIDLEG: FEM 1.25–1.32, TIB 1.35–1.37, TAR I 0.08, TAR II 0.17–0.18, TAR III 0.37; HINDLEG: FEM 1.50, TIB 1.75, TAR I 0.07–0.08, TAR II 0.20, TAR III 0.37–0.40.

Diagnosis. General body color brown to orange brown; posterior margin of pronotum orange; pronotum with small slight pruinose areas posteriorly. Humeral angles spinose. Forewing brownish, with a narrow basal whitish macula starting from humeral angle and ending adjacent to posterior margin of pronotum; centrally with small pruinose areas between cells; at apex another pale yellow macula on central region, with slightly whitish areas surrounding it (Fig. 19B). Legs without spines. Male proctiger with a small median elevation. Paramere narrow at base, with rounded apex (Fig. 20E).

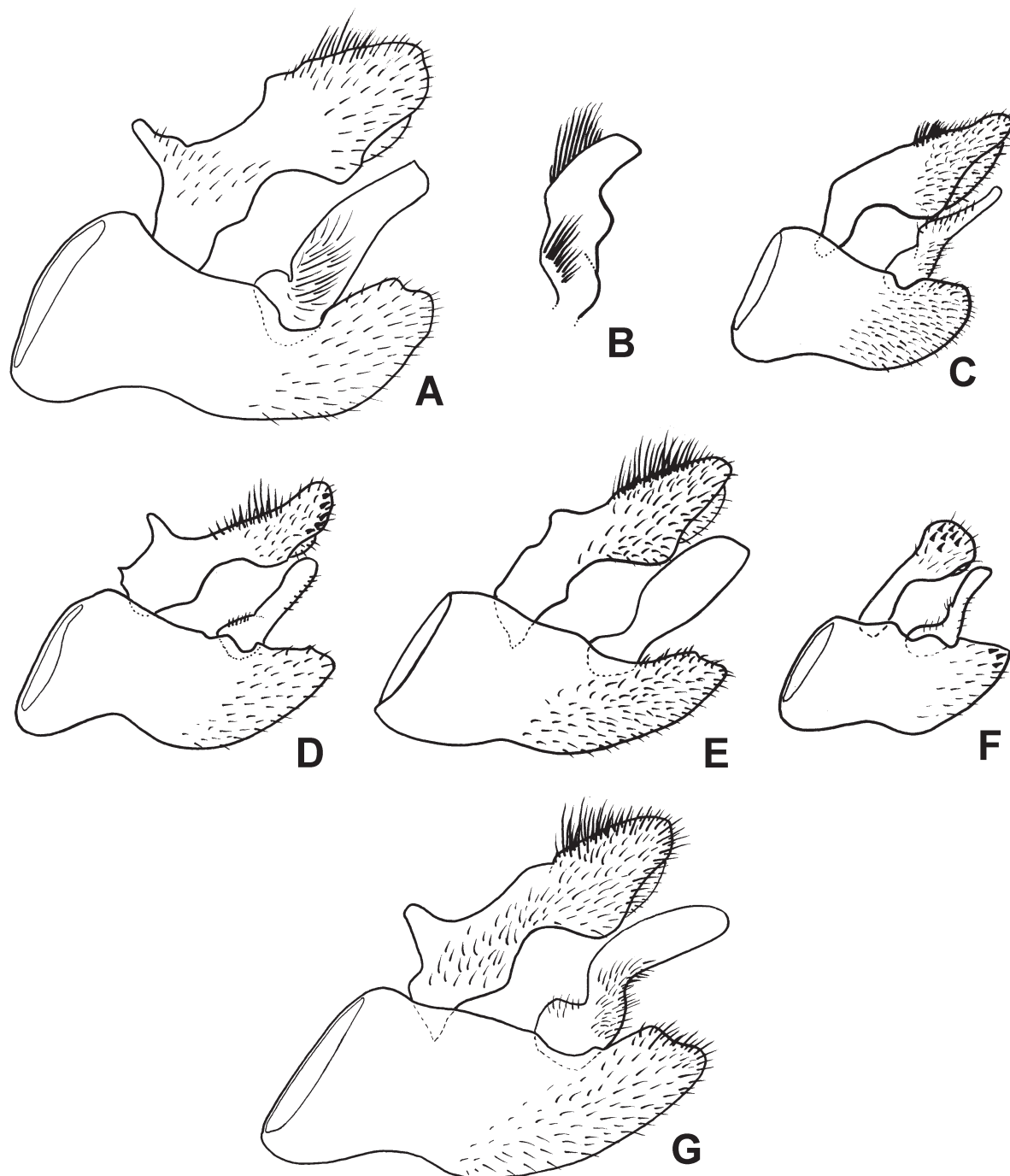


FIGURE 20. Lateral view of genital capsule of male, (A) *P. nieseri*, (B) *P. platensis*, paramere in posterior view, (C) *P. recens*, (D) *P. rotundanotata*, (E) *P. spinifera*, (F) *P. splendoris*, (G) *P. williamsi*.

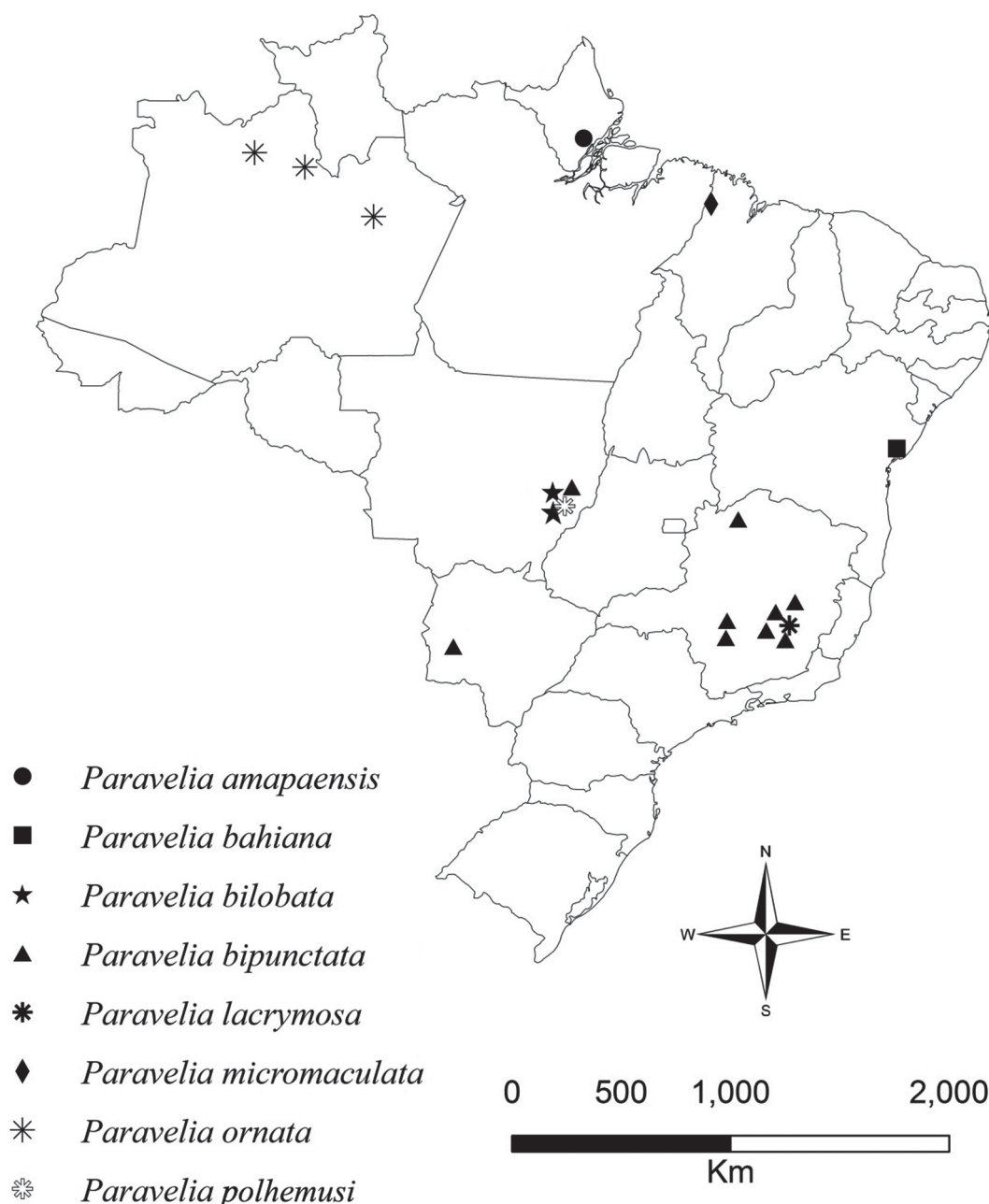


FIGURE 21. Geographic distribution map for the new species of *Paravelia*.

Discussion. This species is easily identified for being the only of the genus with spinose humeral angles (Fig. 20B). Another Veliinae with similar shape is *Stridulivelia alia* (Drake, 1957), which possesses stridulatory devices on hind femur, absent in *P. spinifera*. The species of the genus *Steinovelina* Polhemus & Polhemus, 1993 generally also bear well-developed humeri, similar to obtuse spines; however they have lateral tubercles on metasternum, absent in *Paravelia*. A wide variation was observed on the degree of development of the humeral spines of *P. spinifera*, with some specimens presenting spines much smaller than those illustrated by Polhemus & Polhemus (1984a).

Material examined. Brazil, **Maranhão:** 90 macropterous males, 77 macropterous females (MZUSP), Yavaruhu Village, Rio Gurupi, about 30 km west of Canindé, isolated trail, forest stream with mud, gravel and leaf litter, 14.II.1966, (B. Malkin) [first record from Brazil].

***Paravelia splendoris* (Drake & Harris, 1933)**

(Figs 18C–D, 20F)

Velia splendoris Drake & Harris, 1933: 47. [Original description]

Paravelia splendoris: Polhemus 1976, 513. [New combination; checklist]

Paravelia splendoris: Mazzucconi & Polhemus 2003, 38. [Compared with *P. paxilla*]

Paravelia splendoris: Moreira *et al.* 2011b, 21. [Checklist]

Paravelia splendoris: Melo *et al.* 2011, 3. [New record]

Paravelia splendoris: Heckman 2011, 228. [Identification key]

Micropterous male. BL 2.77–2.90; HL 0.45; HW 0.60; ANT I 0.42–0.47, ANT II 0.32, ANT III 0.38–0.40, ANT IV 0.52–0.55; EYE 0.15; PL 0.87; PW 1.00–1.02; FORELEG: FEM 0.75–0.77, TIB 0.70–0.72, TAR I 0.05, TAR II 0.05–0.06, TAR III 0.25; MIDLEG: FEM 0.87–0.90, TIB 0.87, TAR I 0.05, TAR II 0.10–0.11, TAR III 0.27; HINDLEG: FEM 1.00–1.02, TIB 1.12–1.15, TAR I 0.06–0.07, TAR II 0.12–0.15, TAR III 0.30. **Macropterous male.** BL 3.05; HL 0.45; HW 0.60; ANT I 0.45, ANT II 0.32–0.35, ANT III 0.42, ANT IV 0.50; EYE 0.15; PL 1.12; PW 1.30; FORELEG: FEM 0.77, TIB 0.75, TAR I 0.05, TAR II 0.06, TAR III 0.25; MIDLEG: FEM 0.90, TIB 0.88, TAR I 0.05, TAR II 0.12, TAR III 0.30; HINDLEG: FEM 1.00, TIB 1.22, TAR I 0.06, TAR II 0.13, TAR III 0.28. **Micropterous female.** BL 3.02; HL 0.45; HW 0.62; ANT I 0.47, ANT II 0.32, ANT III 0.40, ANT IV 0.52; EYE 0.15; PL 0.97; PW 1.12; FORELEG: FEM 0.76, TIB 0.70, TAR I 0.05, TAR II 0.06, TAR III 0.25; MIDLEG: FEM 0.87, TIB 0.87, TAR I 0.06, TAR II 0.12, TAR III 0.27; HINDLEG: FEM 1.02, TIB 1.15, TAR I 0.06, TAR II 0.12, TAR III 0.27. **Macropterous female.** BL 3.00–3.30; HL 0.45–0.47; HW 0.60–0.65; ANT I 0.47, ANT II 0.32–0.35, ANT III 0.37–0.42, ANT IV 0.50–0.53; EYE 0.14–0.16; PL 1.07–1.20; PW 1.25–1.41; FORELEG: FEM 0.77–0.82, TIB 0.65–0.75, TAR I 0.05, TAR II 0.06, TAR III 0.22–0.27; MIDLEG: FEM 0.85–0.92, TIB 0.83–0.90, TAR I 0.06, TAR II 0.10–0.12, TAR III 0.25–0.30; HINDLEG: FEM 0.95–1.05, TIB 1.10–1.25, TAR I 0.06–0.07, TAR II 0.12–0.15, TAR III 0.25–0.30.

Diagnosis. Body length 2.30–3.40 mm. General body color brownish; pronotum with midline and posterior margin dark brown; coxae, trochanters, and basal half of femora yellowish, remaining of legs yellowish brown. Body and legs covered by conical small black denticles. Anterior lobe of pronotum with a pair of small slight pruinose areas laterally. Micropterous form (Fig. 18D) with wings almost reaching posterior margin of abdominal tergite III (visible tergite II), white on basal half and apex, centrally brown with lighter areas. Macropterous form (Fig. 18C) with wings reaching genital segments; dark brown, with lighter veins; a basal white macula starting from humeral angle and slightly passing the posterior margin of pronotum; at apex another small rounded macula. Apical portion of first genital segment of male, proctiger, and pygophore with small black denticles. Paramere with rounded apex (Fig. 20F).

Discussion. This species is known from the micropterous and macropterous forms, and was described from Mato Grosso State, Brazil. Recently, this species was recorded from the Chaco province, northern Argentina (Melo *et al.* 2011). It is herein recorded for the first time from Goiás and Minas Gerais, and from other localities in Mato Grosso. *Paravelia bahiana* sp. nov. and *P. paxilla* (Drake, 1957) also have the body covered by small black denticles, but *P. splendoris* differs from the former, because its denticles are conical and pointed backwards, whereas they are rounded, absent on dorsal body and legs, and less distinct in *P. bahiana* sp. nov., which also have different forewing maculae. In relation to *P. paxilla*, the two differ in body length (2.30–3.40 mm in *P. splendoris*; 4.35–4.53 mm in *P. paxilla*) and in the amount of denticles, prominent and numerous in *P. splendoris*, and less prominent and scarcer in *P. paxilla*. Besides that, different from *P. splendoris*, *P. paxilla* is known only from the apterous form.

Material examined. Brazil, **Mato Grosso:** 2 micropterous males, 1 micropterous female (MZUSP), Barra do Garças, Rio Corrente basin, Córrego Taquaral, first order, 15°41'54"S/ 52°20'03"W, 15.I.2005, [1225] (H.S.R. Cabette *et al.*); 1 micropterous male (CZNX), same data, except [1235]; 1 micropterous female (CZNX), same data, except [1094]; 1 macropterous female (CZNX), Nova Xavantina, Rio Pindaíba basin, Córrego da Mata, first order, 14°59'53"S/ 52°28'42"W, 02.XI.2007, [3741] (K. Dias-Silva); 1 micropterous male (CZNX), same data, except [3802]; 1 macropterous female (CZNX), Córrego Buriti, 14°45'01.4"S/ 52°33'14.4"W, 27.IV.2011, [4386] (N.F.S. Giehl); 1 micropterous female (CZNX), Ribeirão Antártico basin, Córrego Duílio, 14°48'18.8"S/ 52°30'10.7"W, 01.V.2011, [4383] (N.F.S. Giehl); 1 macropterous male (CZNX), same data, except [4543]; 1 macropterous male, 1 macropterous female (MZUSP), Córrego Bacaba, ponto 1, 14°43'3.5"S/ 52°21'48.3"W,

01.VI.2011, [6726] (N.F.S. Giehl & P.V.B. Fonseca); 1 macropterous male (CZNX), same data, except 22.III.2012, [6615]; 1 macropterous male (CZNX), same data, except ponto 2, 14°43'10.5"S/ 52°21'35.07"W, 01.VI.2011, [6079]; 1 macropterous male (CZNX), same data, except 04.VII.2011, [6080]; 1 macropterous female (CZNX), same data, except 21.IV.2012, [6602]; 1 micropterous male (CZNX), same data, except 29.VI.2012, [6718]; 1 macropterous male (CZNX), same data, except [6654]. **Goiás:** 1 macropterous male (ZUFG), Niquelândia, 14°12'41"S/ 48°19'42"W, 08.II.2012, (K. Dias-Silva & S.T. Vieira) [First record from Goiás State]. **Minas Gerais:** 2 micropterous males (DPIC), Mariana, Gruta Furna II, setor II, 14.VII.2002, (F.T. Gomes) [First record from Minas Gerais State].

***Paravelia williamsi* Hungerford, 1930**

(Figs 19C–D, 20G)

Velia williamsi Hungerford, 1930a: 25. [Original description]

Paravelia williamsi: Polhemus 1976, 513. [New combination; checklist]

Paravelia williamsi: Heckman 2011, 229. [Identification key]

Macropterous male. BL 5.80; HL 0.70; HW 1.20; ANT I 0.80, ANT II 0.70, ANT III 0.75, ANT IV 0.92; EYE 0.26; PL 2.05; PW 2.00; FORELEG: FEM 1.35, TIB 1.30, TAR I 0.10, TAR II 0.20, TAR III 0.36; MIDLEG: FEM 1.65, TIB 1.75, TAR I 0.11, TAR II 0.56, TAR III 0.46; HINDLEG: FEM 2.00, TIB 2.25, TAR I 0.12, TAR II 0.56, TAR III 0.46.

Diagnosis. General body color brownish; acetabula, coxae, trochanters, and basal half of tibiae yellowish; remainder of legs brown. Forewing with a basal white macula starting from humeral angle and ending adjacent to posterior margin of pronotum; at apex a big oval white macula (Fig. 19C). Abdominal sternites centrally flattened in males and slightly flattened in females. Male with a pair of distinct projections on posterior margin of sternite VII (Fig. 19D) and proctiger with anterior elevation. Paramere elongated, slightly curved centrally, with a small notch on dorsal surface near base, and rounded apex (Fig. 20G).

Discussion. The species was described only from the macropterous form in both sexes. Until now it was known only from the type-locality in Guyana, being herein recorded for the first time from Brazil. The only specimen examined was collected on a temporary pool in the middle of a trail in a “terra-firme” forest. Males of this species have projections on abdominal sternite VII (19D), and differ from other species with such structures by the maculae pattern of the forewings (Fig. 19C). Considering these other species, the apical macula can be smaller (*P. nieseri*), elongated (*P. basalis*), rounded (*P. confusa*), or oval in *P. williamsi* and *P. truxali*. However, the last two species can be easily differentiated by the coloration and shape of the posterior angle of pronotum, being orange and acuminate in *P. truxali*, and brownish and rounded in *P. williamsi*.

Material examined. Brazil, **Amazonas:** 1 macropterous male (INPA), Manaus, Adolpho Ducke Forest Reserve, pool in trail of Igarapé Acará, 05.III.2012, (U.G. Neiss) [first record from Brazil].

Key to the species of *Paravelia* recorded from Brazil

Specimens of part of these species were not examined, and only the characters mentioned in the original descriptions have been considered, which makes the key somewhat preliminary. However, because literature on *Paravelia* is scattered over several, sometimes rather old, small papers dealing with descriptions of one or a few species only, a comprehensive key to the genus is urgently needed.

1. Humeral angle with spinose projection (Fig. 19B) *P. spinifera*
- Humeral angle without spinose projection 2
2. Intersegmental region between head and pronotum and ventrally below acetabulae with a wide stripe of white cuticle (Fig. 5B) *P. bipunctata* **sp. nov.**
- Intersegmental region of these areas without stripe of white cuticle 3
3. Body length less than 3.40 mm 4
- Body length equal to or more than 3.40 mm 5
4. Head, pronotum, legs, and abdomen covered by small black denticles; anterior lobe of pronotum with a pair of pruinose areas laterally (Figs 18C–D) *P. splendoris*

- Body and legs without black denticles, covered by very long setae; anterior lobe of pronotum without pruinosity (Figs 14C–D) *P. capixaba*
- 5. Forewings with bubble-like structures on basal region near humeral angles (Fig. 14A) *P. bullialata*
- Forewings without bubble-like structures 6
- 6. Pronotum with a distinct conical projection between humeral angles (Fig. 15A) *P. conata*
- Pronotum without dorsal conical projection 7
- 7. Venter of abdomen covered by rounded or oval punctations (as in Fig. 6D) 8
- Venter of abdomen not covered by punctations 12
- 8. Male with pronotum distinctly widened anteriorly (Fig. 15B); female without widened pronotum; body length equal to or more than 5.30 mm. *P. dilatata*
- Pronotum not widened anteriorly; body length less than 5.30 mm. 9
- 9. Basal macula of forewing narrowed on posterior half; a small rounded white macula present on side of basal macula (Fig. 17A) *P. foveata*
- Basal macula of forewing with parallel margins; additional rounded maculae absent on base of wing. 10
- 10. Distance between basal and apical maculae of forewings smaller than length of basal macula; apical macula slightly constricted medially (Mazzucconi 2000: Fig. 1) *P. hungerfordi*
- Distance between basal and apical maculae of forewings distinctly greater than length of basal macula; apical macula distinctly constricted medially (as in Fig. 1A) 11
- 11. Apical macula of forewing strongly constricted medially, sometimes disconnected in median region (Figs 4A–B); posterior margin of male abdominal sternite VII with two small lobes (Fig. 6D); male proctiger with a pair of bilobed projections (Fig. 6–F) *P. bilobata* **sp. nov.**
- Apical macula of forewing less constricted medially (Fig. 1A); posterior margin of male abdominal sternite VII without lobes, almost straight (Fig. 1B); projections of male proctiger not bilobed (Fig. 3A–B) *P. amapaensis* **sp. nov.**
- 12. Forewing with white tear-like basal macula, starting from humeral angle and passing posterior margin of pronotum (Fig. 7A) *P. lacrymosa* **sp. nov.**
- Forewing macula not as above 13
- 13. Forewing with a small elongated narrow macula below the posterior margin of pronotum; at apex another pair of laterally placed rounded maculae; all maculae whitish (as in Fig. 14B) 14
- Forewing maculae not as above 15
- 14. Body length 4.20–4.95 mm; tibiae armed with denticles on inner margin (Fig. 14B) *P. capillata*
- Body length 5.50 mm; tibiae unarmed *P. cognata*
- 15. Forewing with basal and apical maculae very small, of similar size, and rounded (Fig. 8A) *P. micromaculata* **sp. nov.**
- Forewing with basal and apical maculae of different size and shape. 16
- 16. Forewing with a subtriangular white basal macula along costal margin; at apex an oval area and a pair of irregular maculae on margin *P. cupariana*
- Forewing maculae not as above. 17
- 17. Head, thorax, and connexives covered by small black denticles; pronotum orange or yellowish orange; forewing with an additional white stripe in front of the basal macula; one macula present on cubital vein and a whitish line surrounding the wing; at apex another white macula (as in Figs 10A, 18B) 18
- Black denticles, if covering body, not distributed as above; forewing at most with basal and apical maculae. 20
- 18. General body color yellowish orange; body length 5.00 mm; male abdominal sternite VII with a pair of distinct projections (Hungerford 1930a: Fig. 9) *P. confusa*
- General body color orange to orange brown; body length 3.80–4.25 mm; male abdominal sternite VII without projections (as in Fig. 10C) 19
- 19. Antennomere IV whitish, with small brown areas on base and apex (Fig. 18B); male proctiger with a distinct horn-like expansion on basal region, and small black denticles on apex (Fig. 20D); posterior angle of last connexival segment of female not developed *P. rotundanotata*
- Antennomere IV entirely orange brown (Fig. 10A); male proctiger only with a basal elevation, without small black denticles on apex (Fig. 12B); posterior angle of last connexival segment of female developed, acute (Fig. 12D) *P. ornata* **sp. nov.**
- 20. Forewing with basal macula distinctly yellow (Figs 11A, 13A–B) 21
- Forewing with basal macula white, yellowish white or orange yellow (the last color can occur in some specimens of *P. itatiana*) 22
- 21. Thorax and abdomen dark brown to black; basal macula of forewing starting from humeral angle; male with a pair of projections on abdominal sternite VII; apical macula of forewings, when present, narrow and elongated (Figs 13A–B); hind femur without spines *P. basalis*
- Thorax dark brown, abdomen ventrally light brown to brown; basal macula of forewing starting close to humeral angle; apical macula of forewings rounded (Fig. 11A); female hind femur with 5–7 spines (Fig. 12F) (male unknown) *P. polhemusi* **sp. nov.**
- 22. Body with small black denticles, distributed on dorsum and venter of head, on abdominal sternites, connexives and/or genital segments 23
- Body without small black denticles 29
- 23. Posterior angle of pronotum acuminate (as in Fig. 17D); male abdominal sternite VII with a pair of acute projections (Moreira & Barbosa 2012: Fig. 13) 24

- Posterior angle of pronotum rounded (as in Fig. 17B) to slightly acute (as in Fig. 13C), not acuminate; male abdominal sternite VII without projections.25
- 24. Pronotum orange, with anterior lobe, humeral angles, and wide median stripe brownish; base of paramere with dorsal surface slightly widened (Polhemus & Polhemus 1985: Fig. 2); female hind femur with about seven black denticles on ventral surface, larger towards apex. *P. truxali*
- Pronotum dark brown to black, with margins of posterior lobe orange (Fig. 17D); paramere with a small basal notch on dorsal surface (Fig. 20A); female hind femur with 4–6 small spines on distal half *P. nieseri*
- 25. Small black denticles present on connexives; body length 3.54–4.00 mm.26
- Small black denticles absent on connexives; body length 4.58–5.10 mm28
- 26. Body length 3.54 mm; first genital segment of male without small black denticles; paramere curved inward, becoming darker and narrower towards apex. *P. nexa*
- Body length 4.00 mm; first genital segment of male with small black denticles laterally; paramere not as above.27
- 27. Paramere curved, constricted near base and after middle, with wide apex. *P. kahli*
- Paramere with apex strongly curved and acute. *P. parilis*
- 28. Anterior lobe of pronotum laterally with a pair of silvery pubescent areas (Figs 2A–B); abdominal sternites covered by rounded small black denticles. *P. bahiana* **sp. nov.**
- Anterior lobe of pronotum without silvery pubescence (Fig. 17B); central region of abdominal sternites II–VII and posterolateral margins of abdominal segment VII covered by conical small black denticles. *P. lanemelo*
- 29. Body length equal to or more than 4.90 mm.30
- Body length less than 4.90 mm (bromeliadiculous species).33
- 30. Posterior angle of pronotum terminating in a small process (as in Fig. 3F) or acuminate; femora and tibiae dark brown; male abdominal sternite VII without projections or lobes on posterior margin31
- Posterior angle of pronotum rounded (as in Figs 19A,C); male abdominal sternite VII with a pair of projections (Fig. 19C) or with two small lobes medially on posterior margin (Hungerford 1930a: Fig. 4).32
- 31. Posterior angle of pronotum acuminate; body length equal to or less than 6.00 mm; paramere slightly narrowed on base, without dorsal notch (Polhemus & Polhemus 1984b: Fig. 5) *P. juruana*
- Posterior angle of pronotum terminating in a small process (as in Fig. 3F); body length more than 6.00 mm; paramere with a dorsal notch near base, slightly curved (Spangler 1989: Fig. 6). *P. biae*
- 32. Femora yellowish on basal half, remaining of legs brownish (Fig. 19C); male with a pair of distinct projections on posterior margin of abdominal sternite VII (Fig. 19D); body length 5.80–6.00 mm. *P. williamsi*
- Legs dark brown (Fig. 19A); posterior margin of male abdominal sternite VII medially extended, forming two small lobes on sides of a central concavity (Hungerford 1930a: Fig. 4); body length 5.03 mm *P. platensis*
- 33. Apical macula of forewings rounded, not touching or nearly reaching the posterior margin of wings (Fig. 18A). *P. recens*
- Apical macula of forewings, when present, elongated and narrow, touching or nearly reaching the posterior margin of wings (as in Figs 15C, 17C).34
- 34. Anterior lobe of pronotum with a pair of pubescent areas (as in Fig. 17C)35
- Anterior lobe of pronotum without pubescence (Figs 15C–D). *P. itatiayana*
- 35. Silvery pubescence on anterior lobe of pronotum longitudinal and narrow slightly bowed outward; paramere narrowed on posterior half (Moreira & Barbosa 2011: Figs 12, 13). *P. gabrielae*
- Whitish pubescence on anterior lobe of pronotum subrectangular and wide (Fig. 17C); paramere not narrowed on posterior half (Polhemus & Polhemus 1991: Fig. 3). *P. manausana*

Checklist and distribution of species of the genus *Paravelia*

TABLE 1. Checklist of species of the genus *Paravelia*, with their known geographic distributions.

Species	Geographic distribution
<i>Paravelia acantha</i> Padilla-Gil, 2013	Colombia (Padilla-Gil 2013)
<i>Paravelia albotrimaculata</i> (Kirkaldy, 1899)	Venezuela (Kirkaldy 1899)
<i>Paravelia amapaensis</i> Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.	Brazil: Amapá (present study)
<i>Paravelia amoena</i> (Drake, 1957)	Venezuela (Drake 1957)
<i>Paravelia anta</i> Mazzucconi, 2000	Paraguay, Argentina (Mazzucconi 2000)
<i>Paravelia atra</i> (Polhemus, 1969)	Peru (Polhemus 1969)
<i>Paravelia bahiana</i> Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.	Brazil: Bahia (present study)

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TABLE 1. (Continued)

Species	Geographic distribution
<i>Paravelia basalis</i> (Spinola, 1837) = <i>Paravelia bicolor</i> (Blanchard, 1843) = <i>Paravelia brasiliensis</i> (Herrich-Schäffer, 1850)	Brazil: Minas Gerais (Kirkaldy 1899; present study), Espírito Santo (present study), São Paulo (Moreira & Barbosa 2011), Rio de Janeiro (Blanchard 1843; Stål 1860; Mayr 1866; Costa Lima 1940; Moreira <i>et al.</i> 2012; present study)
<i>Paravelia biae</i> Spangler, 1989	Brazil: Pará (Spangler 1989), Rondônia (present study)
<i>Paravelia bilobata</i> Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.	Brazil: Mato Grosso (present study)
<i>Paravelia bipunctata</i> Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.	Brazil: Mato Grosso, Minas Gerais, Mato Grosso do Sul (present study)
<i>Paravelia boliviana</i> Breddin, 1898	Peru (Drake & Harris 1938), Bolivia (Breddin 1898; Drake & Harris 1938)
<i>Paravelia bullialata</i> Polhemus & Polhemus, 1984	Guyana (Polhemus & Polhemus 1984a), Suriname (Polhemus & Polhemus 1984a), Brazil: Amazonas (Polhemus & Polhemus 1984a, Pereira & Melo 2007), Rondônia (Rodrigues <i>et al.</i> 2012)
<i>Paravelia capillata</i> (Drake & Harris, 1933)	Brazil: Mato Grosso (Drake & Harris 1933; present study)
<i>Paravelia capixaba</i> Moreira, Nessimian & Rúdio, 2010	Brazil: Pará (Moreira & Campos 2012), Amazonas (Moreira <i>et al.</i> 2011a; Moreira & Campos 2012), Minas Gerais (Rodrigues <i>et al.</i> 2012, present study), Espírito Santo (Moreira <i>et al.</i> 2010)
<i>Paravelia cognata</i> (Drake & Harris, 1933)	Brazil: Maranhão (Drake & Harris 1933)
<i>Paravelia columbiensis</i> (Hungerford 1930)	Colombia (Hungerford 1930b)
<i>Paravelia conata</i> (Hungerford, 1929)	French Guiana (Hungerford 1929d), Brazil: Pará (Hungerford 1929d), Amazonas, Mato Grosso, Goiás, Espírito Santo (present study)
<i>Paravelia confusa</i> (Hungerford, 1930)	Brazil: Pará, Amazonas (Hungerford 1930a)
<i>Paravelia cupariana</i> Polhemus & Polhemus, 1984	Brazil: Pará (Polhemus & Polhemus 1984b)
<i>Paravelia daza</i> Padilla-Gil & Moreira, 2011	Colombia (Padilla-Gil & Moreira 2011)
<i>Paravelia dilatata</i> Polhemus & Polhemus, 1984	Suriname (Polhemus & Polhemus 1984b), Brazil: Amazonas (Polhemus & Polhemus 1984b; Pereira & Melo 2007; present study)
<i>Paravelia fanera</i> Padilla-Gil, 2013	Colombia (Padilla-Gil 2013)
<i>Paravelia flavomarginata</i> (Hungerford, 1930)	Colombia (Hungerford 1930b)
<i>Paravelia foveata</i> Polhemus & Polhemus, 1984	Venezuela (Mazzucconi 2000), Brazil: Roraima (present study), Amazonas (Polhemus & Polhemus 1984b)
<i>Paravelia gabrielae</i> Moreira & Barbosa, 2011	Brazil: Espírito Santo, São Paulo (Moreira & Barbosa 2011) [bromeliads]
<i>Paravelia helenae</i> (Hungerford, 1929)	Peru (Hungerford 1929b; Polhemus 1969; Polhemus & Polhemus 1991) [bromeliads]
<i>Paravelia hungerfordi</i> (Drake & Harris, 1933)	Brazil: Mato Grosso (Drake & Harris 1933)
<i>Paravelia inveruglas</i> (Kirkaldy, 1899)	Ecuador (Kirkaldy 1899)
<i>Paravelia itatiayana</i> (Drake, 1951)	Brazil: São Paulo (Moreira & Barbosa 2011), Rio de Janeiro (Drake 1951; Moreira & Barbosa 2011; Moreira <i>et al.</i> 2012) [bromeliads]
<i>Paravelia juruana</i> Polhemus & Polhemus, 1984	Brazil: Amazonas (Polhemus & Polhemus 1984b)
<i>Paravelia kahli</i> (Drake & Harris, 1933)	Brazil: Mato Grosso (Drake & Harris 1933)
<i>Paravelia lacrymosa</i> Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.	Brazil: Minas Gerais (present study)
<i>Paravelia lanemelo</i> Moreira & Barbosa, 2012	Brazil: Minas Gerais (Moreira & Barbosa 2012; present study)
<i>Paravelia manausana</i> Polhemus & Polhemus, 1984	Venezuela, Ecuador, Peru, Bolivia (Polhemus & Polhemus 1991), Brazil: Amazonas (Polhemus & Polhemus 1984a; Polhemus & Polhemus 1991) [bromeliads]

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TABLE 1. (Continued)

Species	Geographic distribution
<i>Paravelia micromaculata</i> Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.	Brazil: Maranhão (present study)
<i>Paravelia myersi</i> (Hungerford, 1931)	Panama (Fincke 1999; Polhemus 1999; Yanoviak 1999, 2001), Trinidad & Tobago (Hungerford 1931) [tree holes]
<i>Paravelia nexa</i> (Drake & Harris, 1933)	Brazil: Maranhão (Drake & Harris 1933)
<i>Paravelia nieseri</i> Moreira & Barbosa, 2012	Brazil: Minas Gerais (Moreira & Barbosa 2012; present study)
<i>Paravelia ornata</i> Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.	Brazil: Amazonas (present study)
<i>Paravelia osborniana</i> (Kirkaldy, 1909) = <i>Velia brunnea</i> Osborn, 1904 [nec <i>Velia brunnea</i> Horváth, 1898]	Peru (Hungerford 1930b; Poisson 1954), Bolivia (Osborn 1904; Hungerford 1930b)
<i>Paravelia paolettii</i> Polhemus & Polhemus, 1991	Venezuela (Polhemus & Polhemus 1991) [bromeliads]
<i>Paravelia parilis</i> (Drake & Harris, 1933)	Brazil: Mato Grosso (Drake & Harris 1933)
<i>Paravelia paxilla</i> (Drake, 1957)	Argentina (Drake 1957; Mazzucconi & Polhemus 2003)
<i>Paravelia platensis</i> (Berg, 1883)	Argentina (Berg 1883; Río & Achával 1904; Thaxter 1912; Mazzucconi <i>et al.</i> 2009; Nanni <i>et al.</i> 2011), Uruguay (Berg 1883; Mazzucconi & Bachmann 2003), Brazil: São Paulo (present study)
<i>Paravelia polhemusi</i> Rodrigues, Moreira, Nieser, Chen & Melo, sp. nov.	Brazil: Mato Grosso (present study)
<i>Paravelia recens</i> (Drake & Harris, 1935)	Honduras (Polhemus & Polhemus 1991), Colombia (Polhemus & Polhemus 1991), Venezuela (Drake & Maldonado-Capriles 1952), Trinidad & Tobago (Nieser & Alkins-Koo 1991), Panama (Drake & Harris 1935), Guyana (Drake & Hussey 1954), Peru (Polhemus & Polhemus 1991), Bolivia (Polhemus & Polhemus 1991), Paraguay (Polhemus & Polhemus 1991), Brazil: Pará (Polhemus & Polhemus 1991), Amazonas (Drake & Hussey 1954; Polhemus & Polhemus 1991; Pereira <i>et al.</i> 2007), Espírito Santo (present study) [bromeliads]
<i>Paravelia rotundanotata</i> (Hungerford, 1930)	Argentina (Hungerford 1930a), Brazil: Mato Grosso (present study), Minas Gerais (Hungerford 1930a), Mato Grosso do Sul (present study)
<i>Paravelia spinifera</i> Polhemus & Polhemus, 1984	Suriname (Polhemus & Polhemus 1984a), Brazil: Maranhão (present study)
<i>Paravelia splendoris</i> (Drake & Harris, 1933)	Argentina (Melo <i>et al.</i> 2011), Brazil: Mato Grosso (Drake & Harris 1933; present study), Goiás (present study), Minas Gerais (present study)
<i>Paravelia stenoptera</i> Polhemus & Polhemus, 1984	Suriname (Polhemus & Polhemus 1984a)
<i>Paravelia taipiensis</i> (Cheesman, 1926)	Marquesas Islands (Cheesman 1926)
<i>Paravelia truxali</i> Polhemus & Polhemus, 1985	Brazil: Goiás (Polhemus & Polhemus 1985)
<i>Paravelia velitis</i> (Drake, 1951)	Mexico (Drake 1951)
<i>Paravelia virtutis</i> (Drake & Harris, 1935)	Panama (Drake & Harris 1935)
<i>Paravelia willei</i> (Drake & Harris, 1940)	Peru (Drake & Harris 1940; Mazzucconi & Polhemus 2003)
<i>Paravelia williamsi</i> (Hungerford, 1930)	Guyana (Hungerford 1930a), Brazil: Amazonas (present study)

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