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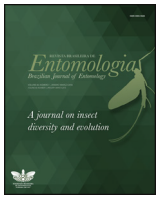

Revision of the American genus *Platyvelia* Polhemus & Polhemus, 1993 (Heteroptera: Gerromorpha: Veliidae)

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ABSTRACT

The subfamily Veliinae (Heteroptera: Gerromorpha: Veliidae) includes ten genera worldwide, seven of which are endemic to the American continent. Here, we provide a revision of *Platyvelia* Polhemus and Polhemus, 1993, which is distributed from the United States to northern Argentina, and included nine valid species prior to this study. Six species are redescribed, the synonymies of *P. egregia* (Drake and Harris, 1935) and *P. verdica* (Drake, 1951) with *P. brachialis* (Stål, 1860) are proposed, a lectotype is designated for *P. annulipes*, and two species groups are erected based on male characters: the *P. annulipes* group and the *P. brachialis* group. Keys to the species groups and species within each group, photos, and distribution maps are also included.

Introduction

Veliids (Heteroptera: Gerromorpha: Veliidae), also known as small water striders (Smith, 1988), are comprised in a family with over 900 species (Polhemus and Polhemus, 2008). Currently, it is divided into six subfamilies: Ocelloveliinae, Perittopinae, Rhagoveliinae, Veliinae, Haloveliinae, and Microveliinae (Andersen, 1982; Moreira, 2015). Veliinae have nearly worldwide distribution, except for Australia and Antarctica, but are more diversified in the New World and the western Palaearctic Region (Andersen, 1981; Berchi et al., 2017). In the Neotropical Region, the subfamily currently includes the genera *Altavelia* Polhemus & Moreira, 2019, *Oiovelia* Drake & Maldonado-Capriles, 1952, *Paravelia* Breddin, 1898, *Platyvelia* Polhemus & Polhemus, 1993, *Steinovelia* Polhemus & Polhemus, 1993, *Stridulivelia* Hungerford, 1929, and *Veloidea* Gould, 1934 (Andersen, 1982; Polhemus and Polhemus, 1993; Polhemus et al., 2019). These genera share the following (plesiomorphic) features: (1) tarsi three-segmented on all legs, (2) pronotum posteriorly extended in apterous forms, covering the meso- and usually almost entirely the metanotum, and (3) parameres large and symmetrical (Andersen, 1982).

According to the original description, *Platyvelia* differs from other Veliinae by the absence of ocular setae, lateral opposing tubercles on meso- and metasterna, and pattern of white spots on the fore wing or silverish setae on the posterior portion of the abdomen in apterous specimens (Polhemus and Polhemus, 1993). Prior to this study, the genus included nine species: *P. alvaradana* (Drake & Hottes, 1952), *P. annulipes* (Champion, 1898), *P. beameri* (Hungerford, 1929a), *P. brachialis* (Stål, 1860), *P. egregia* (Drake & Harris, 1935), *P. maritima* (Polhemus & Manzano, 1992), *P. summersi* (Drake, 1951), *P. verana* (Drake & Hottes, 1952), and *P. verdica* (Drake, 1951) (Polhemus and Polhemus, 1993). These species occur in different environments, including artificial reservoirs (Vianna and Melo, 2003), streams (Floriano et. al., 2013), and lowland lakes (Pereira et al., 2007). They can be found among or on emergent plants rather than on the open water surface, and sometimes they walk on land (Epler, 2006; Mazzucconi et al., 2009).

Studies on the genus are scarce, consisting mainly of species descriptions and new records. In the present paper, we provide a

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revision of *Platyvelia*, the redescription of *P. alvaradana*, *P. annulipes*, *P. brachialis, P. maritima*, *P. summersi*, and *P. verana*, and propose the synonymies of *P. egregia* and *P. verdica* with *P. brachialis*. A lectotype is designated for *P. annulipes*. The species of *Platyvelia* are arranged into two newly proposed species groups based on three male characters: the *P. annulipes* group and the *P. brachialis* group. Lastly, we present a key for these two groups and their species, as well as, photos and distribution maps.

Material and methods

This study is based on specimens deposited in the Natural History Museum, London, UK (BMNH); Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil (MZUSP); Naturhistorisches Museum Wien, Vienna, Austria (NHMW); Naturhistoriska Riksmuseet, Stockholm, Sweden (NHRS); and National Museum of Natural History, Smithsonian Institution, Washington D.C., USA (NMNH). In the NMNH, series of photographs were taken using a Cannon EOS 5D and combined into multi-focal images using the Visionary Digital® Software, whereas in the NHMW photographs were taken with a Leica DFC450 camera attached to a Leica Z16APO optics carrier and stacked with Leica Application Suite V3.8. Measurements are given in millimeters and abbreviated as follows: BL: body length; HL: head length; HW: head width through eyes; ANT: length of antennomeres I–IV (ANTI, ANTII, ANTIII, ANTIV); EYE: maximum eye width; PL: pronotum length on midline; PW pronotum width; FEM: femoral length; TB: tibial length; and TAR: length of tarsomeres (TAR I, TAR II, TARIII).

We used the software QGIS 2.6.1 to make maps. Distributions shown on the maps are based on Stål (1860), Uhler (1894), Champion (1898), Snow (1905), Barber (1914), Torre-Bueno (1916), Drake (1922), Blatchley (1926), Allee and Torvik (1927), Hungerford (1929a), Hungerford (1929b), Drake and Harris (1935), Millspaugh (1939), Harris and Drake (1941), Hynes (1948), Herring (1950), Drake (1951), Drake and Hottes (1951), Drake and Hottes (1952), Ellis (1952), Drake and Maldonado-Capriles (1956), Drake (1957), Wilson (1958), Alayo (1967), Schaefer and Drew (1968), Polhemus (1973), Roback and Nieser (1974), Alayo (1974), Gosselink and Cordes (1979), Smith (1988), Polhemus and Manzano (1992), Polhemus and Polhemus (1993), Nieser and Melo (1997), Korch et al. (1999), Frick et al. (2002), Swarzenski et al. (2004), Melo and Nieser (2004), Epler (2006), Souza et al. (2006), Torres et al. (2008), Stevens and Polhemus (2008), Mazzucconi et al. (2009), Ribeiro et al. (2010), Ziser (2010), Moreira et al. (2010), Lanigan and Hyslop (2011), Peralta-Argomeda (2011), Bogan and Lytle (2011), Muñoz et al. (2012), Rodrigues et al. (2012), Dias-Silva et al. (2013), Floriano et al. (2013), Pacheco-Chaves et al. (2014), Peralta-Argomeda and Huamantinco-Araujo (2014), Rodrigues et al. (2014), Cordeiro and Moreira (2015), Cunha et al. (2015), Perez-Gelabert and Floriano (2016), Crumière et al. (2016), Molano et al. (2016), Floriano et al. (2017), Aristizábal (2017), Moreno et al. (2018), Dias-Silva et al. (2020), Jain et al. (2020), and Pintar and Resetarits (2020). Localities that are too imprecise (e.g., only the country or state is known) are displayed on the maps as question marks.

Results and discussion

Platyvelia Polhemus & Polhemus 1993

Platyvelia, Polhemus & Polhemus, 1993: 391–394.

Type species: *Velia brachialis* Stål, 1860, by original designation.

Diagnosis: General color usually brown with transverse yellow stripes on legs; body length 3.60–7.00 mm; ocular setae absent; mesoacetabulum with a large, deep puncture on posteromesal surface; a tubercle on posteromesal corner of mesoacetabulum, which opposes a tubercle on anterolateral corner of metasternum; intersegmental area between meso- and metasterna without tubercles near midline; posterior margin of metasternum straight or slightly concave at midline (Fig. 1A); femora and tibiae with small black spinules on flexor side (Fig. 1B); typical pattern of apical white spots on fore wing in macropterous specimens (Fig. 1D) or of silverish setae on posterior portion of abdominal mediotergites in apterous and micropterous specimens (Figs. 1C, 9F); laterotergites elevated to about 45°, not projecting into spines on posterior end (Fig. 10C).

Discussion. Species of *Platyvelia* were originally described in *Velia* Latreille, 1804 (except for *P. maritima*, which was described in *Paravelia*) and then transferred to *Paravelia* by Polhemus (1976). Later, Polhemus and Polhemus (1993) described *Platyvelia* for ten species names of *Paravelia* (nine valid species and one junior synonym) and indicated three putative autapomorphies for the genus: (1) position of the tubercle on the posteromesal corner of the mesoacetabulum, which opposes a tubercle on the anterolateral corner of the metasternum, (2) pattern of white spots on the fore wing, and (3) silverish setae on the abdominal mediotergites in apterous and micropterous specimens. The genus *Platyvelia* has not been revised and most of its species were not redescribed or illustrated. Herein, we propose two groups to accommodate the species of *Platyvelia*: *P. annulipes* and *P. brachialis* species groups. Species of *Platyvelia* have few diagnostic features, specially those of the *P. annulipes* group, being diagnosed based on subtle or continuous characters such as paramere shape or body length (Drake and Hottes, 1952). These issues can be diminished by the use of molecular tools and the study of different populations in order to better understand the patterns of intraspecific variation.

Key to the species groups of *Platyvelia*

1. Male abdominal sternum VI with a median projection; male abdominal sternum VII with posterior margin straight or nearly so (Fig. 1F); paramere sculptured (Figs. 8A–D) ..... ***Platyvelia annulipes* species group**

1'. Male abdominal sternum VI without median projection; male abdominal sternum VII with posterior margin concave (Figs. 1E, 9D); paramere not sculptured (Figs. 8E–G) ..... ***Platyvelia brachialis* species group**

Platyvelia annulipes species group

This species group is characterized by the male abdominal sternum VI with a median projection (Fig. 6), the posterior margin of the male abdominal sternum VII is straight or nearly so (Fig. 6), and the paramere is sculptured (Figs. 8A–D). The species in this group are distributed only in North and Central America (Fig. 7).

Key to the species of the *P. annulipes* species group

1. Median projection of male abdominal sternum VI not reaching posterior margin of sternum VII (Fig. 6B); paramere as in Fig. 8C ..... ***Platyvelia annulipes***

1'. Median projection of male abdominal sternum VI reaching or surpassing posterior margin of sternum VII (Figs. 6A, 6C–D); paramere not as above 2

2. Median projection of male abdominal sternum VI tapering posteriorly, forming a pointed apex (Fig. 6C); paramere as in Fig. 8D .. ***Platyvelia summersi***

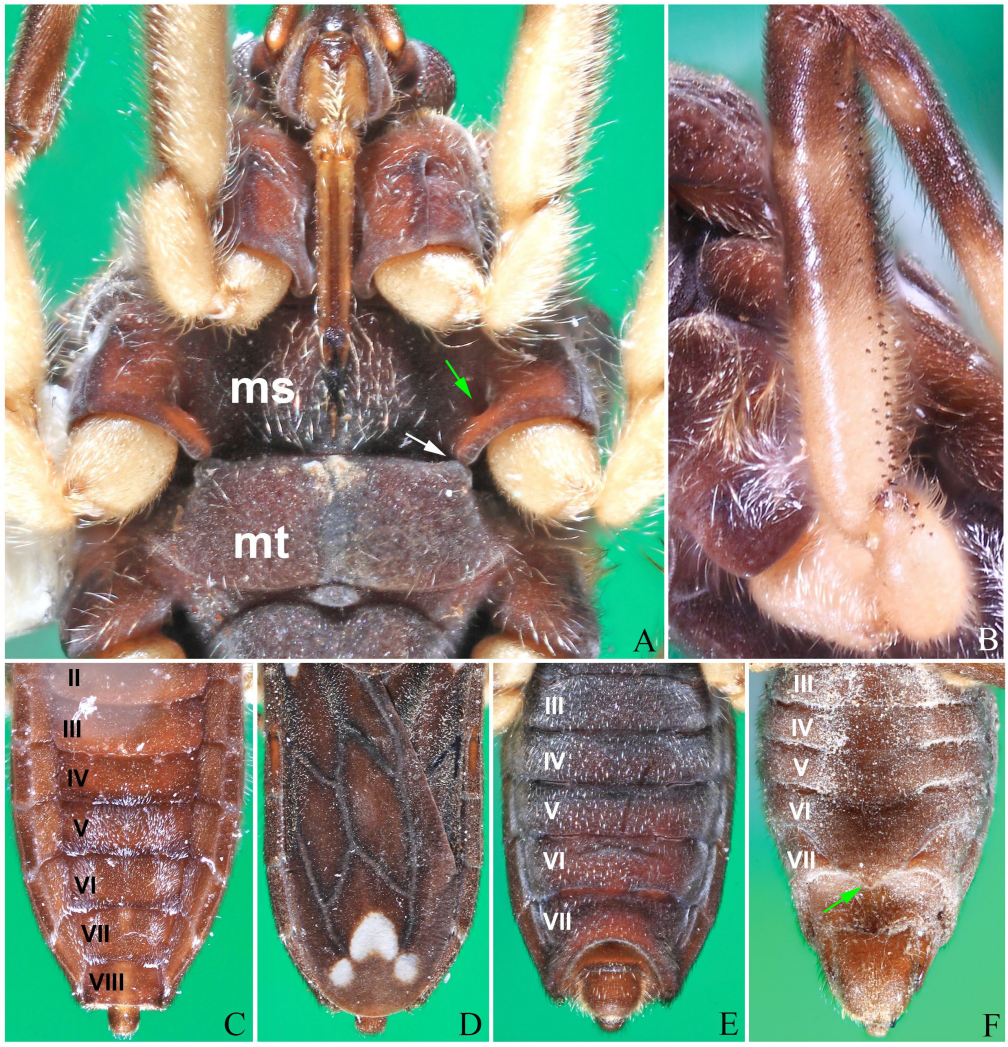

Figure 1. Structures of *Platyvelia*, (A–E) *P. beameri*, (F) *P. summersi*. (A) Ventral view of thorax, ms = mesosternum, mt = metasternum, white arrow indicates junction of tubercle on posteromesal corner of mesoacetabulum and tubercle on anterolateral corner of metasternum, green arrow indicates a large, deep puncture on posteromesal surface of mesoacetabulum, (B) hind leg showing small black denticles on flexor side, (C) dorsal view of abdomen, micropterous female, (D) dorsal view of fore wing showing apical maculae, macropterous female, (E) ventral view of abdomen, male of the *Platyvelia brachialis* species group, (F) ventral view of abdomen, male of the *Platyvelia annulipes* species group, green arrow indicates projection of abdominal sternum VI. Abdominal segment numbers are expressed as Roman numerals.

2'. Median projection of male abdominal sternum VI truncate at posterior margin (Figs. 6A, 6D); paramere as in Figs. 8A–B 3

3. Antennomere II with a yellow band at mid-length (Figs. 2A–C;) paramere as in Fig. 8A; body length 5.6 ..... ***Platyvelia alvaradana***

3'. Antennomere II entirely yellowish brown (Figs. 5A, 5C); paramere as in Fig. 8B; body length 5.0 ..... ***Platyvelia verana***

Platyvelia alvaradana (Drake and Hottes, 1952)

(Figs. 2, 6A, 7, 8A)

Velia alvaradana Drake and Hottes, 1952: 85–87 (original description);

Paravelia alvaradana; Polhemus 1976: 512 (changed combination);

Platyvelia alvaradana; Polhemus and Polhemus 1993: 394 (changed combination).

Redescription. Micropterous male holotype, BL 5.65; HW 0.98; ANT I 1.55, ANT II 0.90, ANT III 0.94, ANT IV 0.75; EYE 0.30; PL 1.40; PW 1.63; FORELEG: FEM 1.99, TIB 1.89, TAR I 0.10, TAR II 0.16, TAR III 0.41; MIDLEG: FEM 2.65, TIB 2.61, TAR I 0.15, TAR II 0.53, TAR III 0.49; HINDLEG: FEM 2.13, TIB 2.65, TAR I 0.10, TAR II 0.40, TAR III 0.44.

Head brown, darker along impressed shiny longitudinal midline, with two shiny oblique indentations near base. Antenna brown, lighter on a wide band on mid-length of antennomere II and on intersegmental piece between II–III. Eye dark-red. Venter of antenniferous tubercle, buccula, and articles I–III of labium yellowish-brown; article IV shiny black. Pronotum brown on middle of anterior margin and on posterior lobe, dark-brown on side of anterior lobe, with a wide orangish-brown area on center of anterior lobe extending to base of posterior lobe, sided by small patch of silverish setae (Fig. 2A). Pleural region of thorax and lateral surface of each acetabula mostly dark-brown, with scattered areas of reddish-brown; large areas of silverish setae located dorsally to pro- and mesoacetabula and posterodorsally to metacetabulum (Fig. 2D). Pro-, mesosterna, and mesal surface of each acetabula orangish-brown. Metasternum centrally dark-brown, laterally reddish-brown. Wing of micropterous morph pearly-white. Coxae and trochanters yellow. Fore femur yellow on proximal half; distal half brown with narrow yellow band on middle and small apical yellow mark. Middle and hind femora with proximal yellow area much shorter, with same yellow mark on distal half. Tibiae brown, each with narrow yellow band close to base and wider yellow band approximately at middle. Tarsi brown with dark-brown apexes. Abdominal mediotergites I–VI reddish-brown, with scattered areas of orangish-brown; VII orangish-brown with dark-

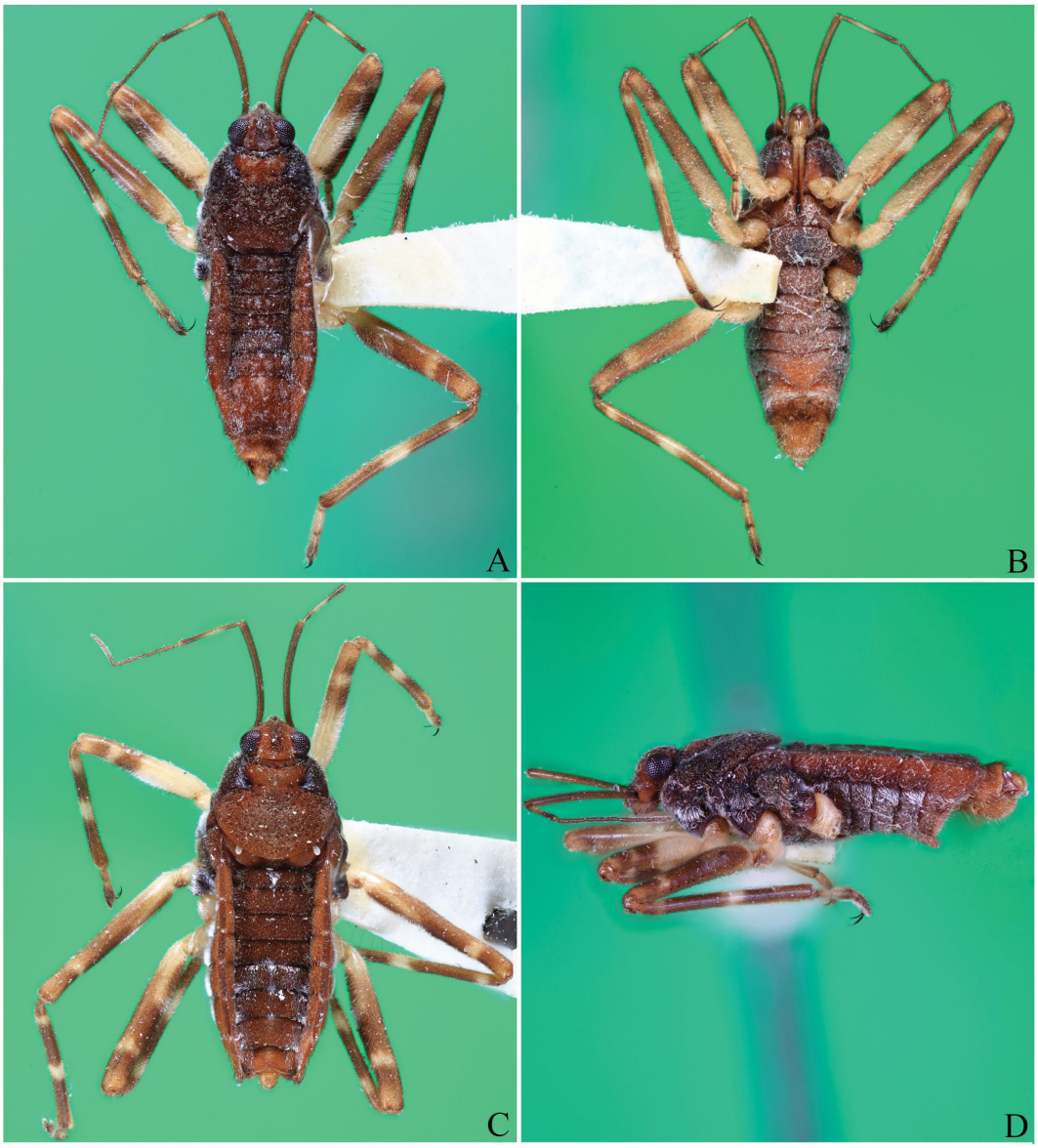

Figure 2. *Platyvelia alvaradana*, (A–B) holotype, micropterous male (NMNH), (A) dorsal habitus, (B) ventral habitus, (C) allotype, micropterous female (NMNH), dorsal habitus, (D) holotype, micropterous male (NMNH), lateral habitus.

brown posterior margin; V with silverish setae adjacent to anterior margin, laterally, and on a small patch on middle of posterior margin; VI laterally and on a small patch on middle of posterior margin; VII only laterally; VIII with a pair of lateral patches of silverish setae. Laterotergites orangish-brown to reddish-brown, narrowly dark-brown on lateral margins, with small silverish patches on posterolateral angles of all segments except last (Fig. 2A). Side of abdomen with large patch of silverish setae on all segments. Abdominal sterna orangish-brown medially, reddish-brown laterally.

Head and body dorsally velvety, densely covered by short, shiny, decumbent setae. Longer setae present in front of eye, adjacent to mesal eye margin, buccula, jugum, base of labium, side of body, proepisternum, and posteriorly on abdominal segment VII and terminalia. Head strongly inserted into concave anterior margin of pronotum. Antennomere I thickest, slightly wider on apex, curved laterally; II–IV with subequal width; II–III cylindrical; IV fusiform. Ocular setae absent. Buccula with three circular punctures close to ventral margin. Small black denticles present on jugum and adjacent portion of proepisternum; absent from acetabula and abdominal sterna I–VI. Labium surpassing middle of mesosternum. Pronotum with lateral margin almost continuously rounded, very slightly constricted between lobes; posterior margin broadly rounded, a bit flattened centrally; median carina very weak, more perceptible on anterior region of posterior lobe; orange marked area slightly swollen anteriorly and along midline. Continuous row of circular punctures adjacent to anterior margin of pronotum; a pair of deeper punctures between anterior and posterior lobes; posterior lobe with several tiny scattered punctures. Pleural region of thorax with several circular punctures, mainly on posterior margin of propleuron and anterior margin of mesopleuron; mediodorsal area of propleuron with one larger puncture; lateral surface of each acetabula with few smaller punctures. Mesosternum medially impressed. Mesoacetabulum with a large, deep puncture on posteromesal surface, with posterior margin extending centrally to form a tubercle that touches another one projecting from anterolateral portion of metasternum (Fig. 2B). Wing of micropterous morph very short, not reaching abdominal mediotergite I. Legs covered by decumbent brown setae; femora also with longer curved setae, especially on flexor side; tibiae also with longer straight setae; middle tibia with a row of very long thin setae starting right before middle. Flexor surface of fore femur with few spine-like black setae. Fore tibia, middle femur, and

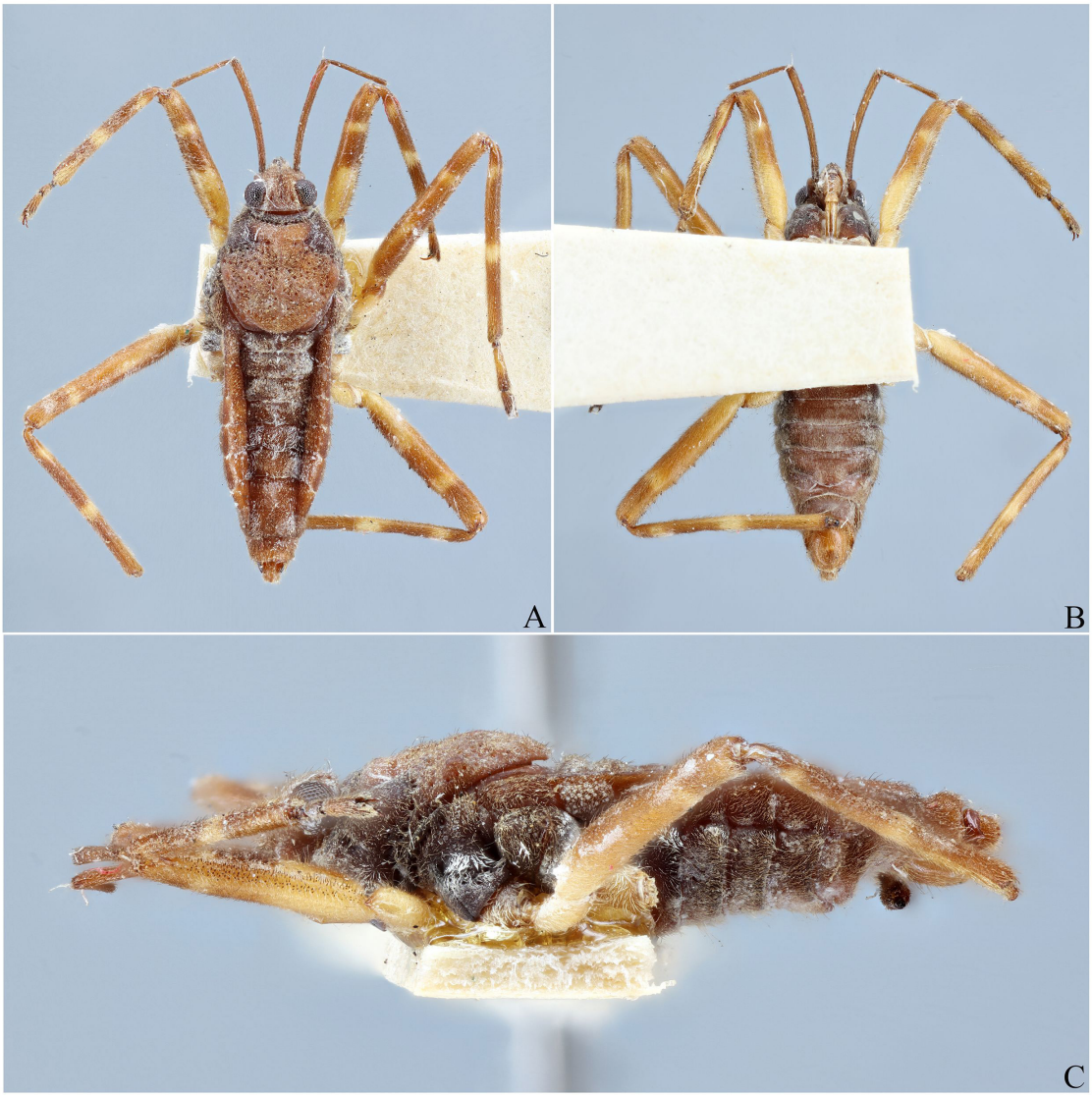

Figure 3. *Platyvelia annulipes*, lectotype, apterous male (BMNH), (A) dorsal habitus, (B) ventral habitus, (C) lateral habitus. Figures © K. Merrifield/ BMNH.

hind trochanter, femur, and tibia with several black spinules; middle and hind femora also with some more robust and slightly longer curved spines. Abdominal mediotergites transversely rectangular, except VII subquadrate with concave posterior margin. Abdominal sternum II laterally compressed; III–V centrally depressed; VI with a large triangular projection extending over VII; lateral margin of projection sinuous; posterior portion narrowed, elongated, truncate at apex (Fig. 6A). Posterolateral margin of abdominal segment VII with robust black denticles; these absent from segment VIII. Abdominal segment VIII elevated centrally in dorsal view, with broadly rounded posterior margin; flattened ventrally, with convex posterior margin a little extended over pygophore. Paramere tightly appressed to proctiger, shape as in Fig. 8A.

Discussion. The posterior portion of the medial projection of the male abdominal sternum VI exceeds the posterior margin of the sternum VII (Fig. 6A), which also occurs in *P. summersi* (Fig. 6C) and *P. verana* (Fig. 6D). In *P. summersi* the projection tapers slightly towards the apex, whereas in *P. alvaradana* and *P. verana* it is truncate at the apex. These last two species are distinguished by the antennomere II and by the shape of the paramere. In *P. alvaradana*, the antennomere II has a yellow band at mid-length (Figs. 2A–C) and the paramere is as in Fig. 8A, whereas in *P. verana* the antennomere II is entirely yellowish brown (Figs. 5A, 5C) and the paramere is as in Fig. 8B. Drake and Hottes (1952) described *P. alvaradana* based on specimens from two localities at Puebla and Veracruz states in Mexico. Polhemus (1973), in a short note within the section dedicated to *Velia summersi* (= *P. summersi*), mentioned that *P. alvaradana* was distributed up to northern Mexico, at Sonora state, but did not offer details or specified the material that he examined (Fig. 7).

Type material examined. Holotype, micropterous male (NMNH), Mexico, Puebla, 20.VII.1951. Allotype, micropterous female (NMNH), same data as holotype.

Platyvelia annulipes (Champion, 1898)
(Figs. 3, 6B, 7, 8C)

Velia annulipes Champion, 1898: 142–143 (original description);
Paravelia annulipes; Polhemus 1976: 512 (changed combination);
Platyvelia annulipes; Polhemus and Polhemus 1993: 394 (changed combination).

Redescription. Apterous male lectotype, BL 6.10, PW (across humeral angles) 1.85. Head brown, slightly darker along impressed

Figure 4. *Platyvelia summersi*, (A–B) apterous male, (A) dorsal habitus, (B) ventral habitus, (C–D) holotype, macropterous female (NMNH), (C) dorsal habitus, (D) ventral habitus, (E) apterous male, lateral habitus.

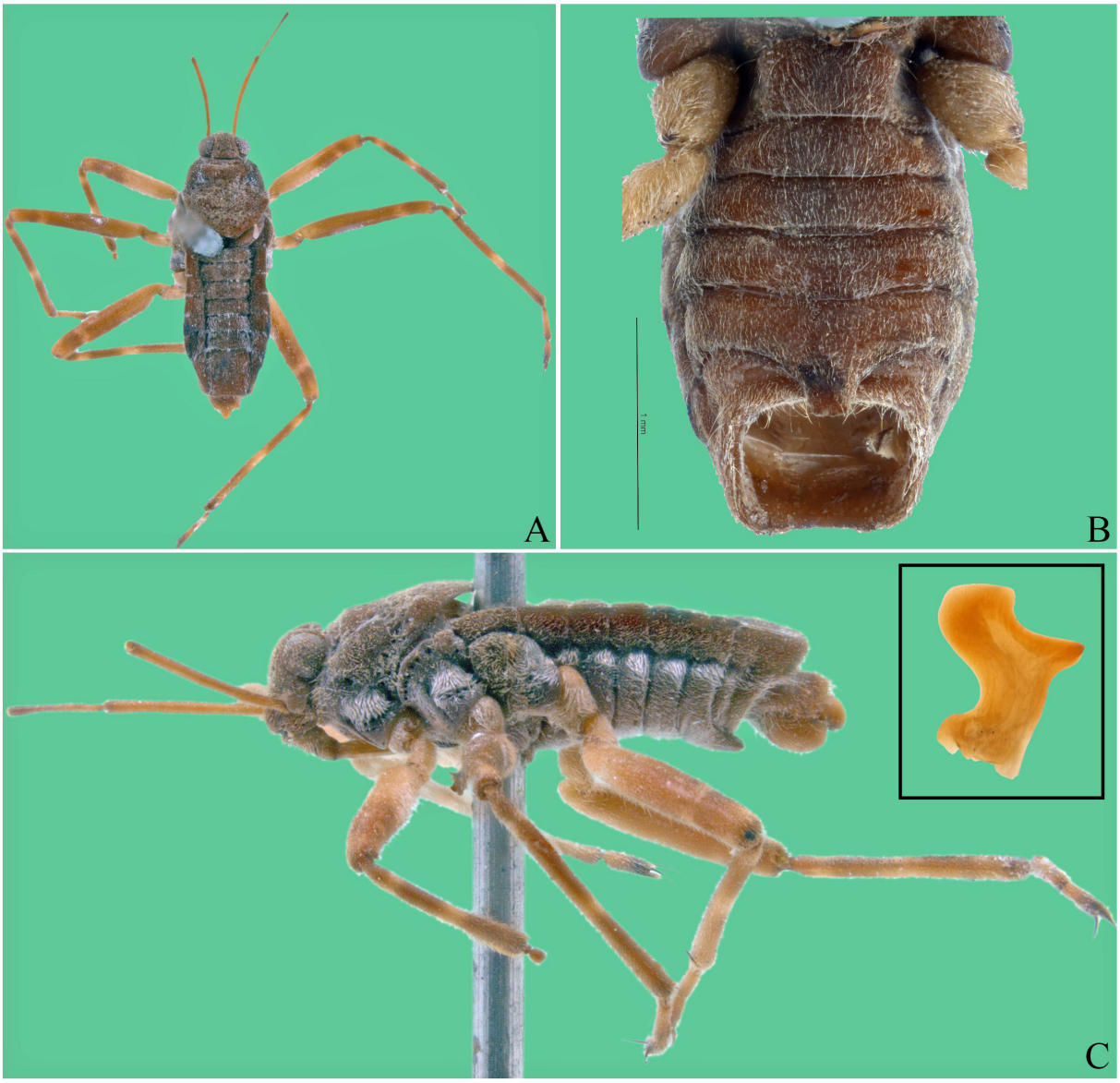

Figure 5. *Platyvelia verana*, holotype, micropterous male (NHMW), (A) dorsal habitus, (B) abdominal sterna (abdominal segment VIII and genital capsule removed), (C) lateral habitus, showing paramere in lateral view.

Figure 6. *Platyvelia annulipes* species group, abdomen in ventral view, (A) *P. alvaradana*, white arrow indicates the projection, (B) *P. annulipes*, (C) *P. summersi*, (D) *P. verana*. Abdominal segment numbers are expressed as Roman numerals.

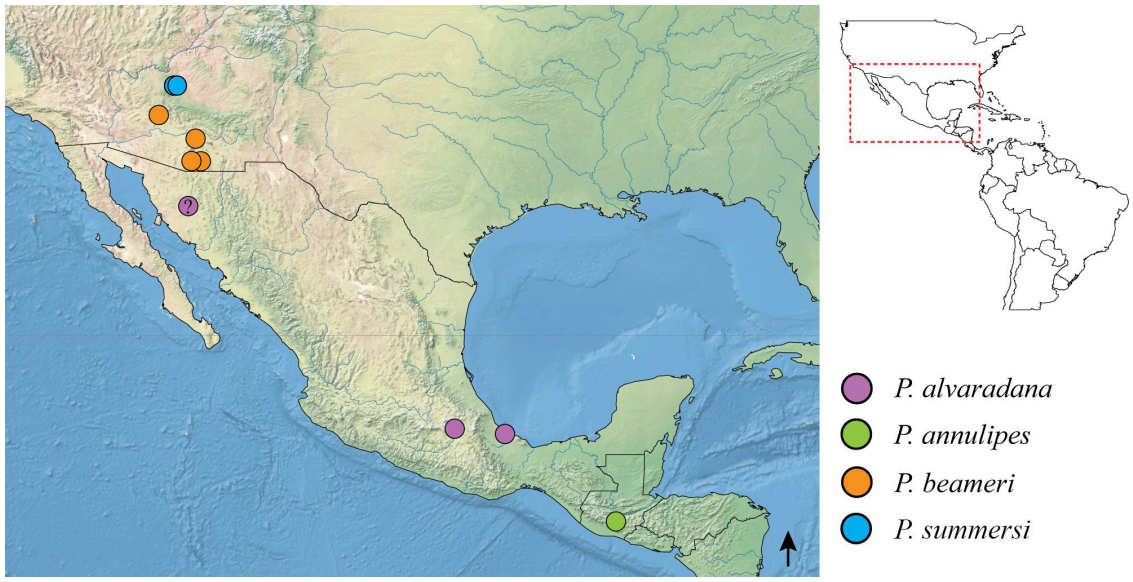

Figure 7. Distribution records for species of *Platyvelia* in North and Central America.

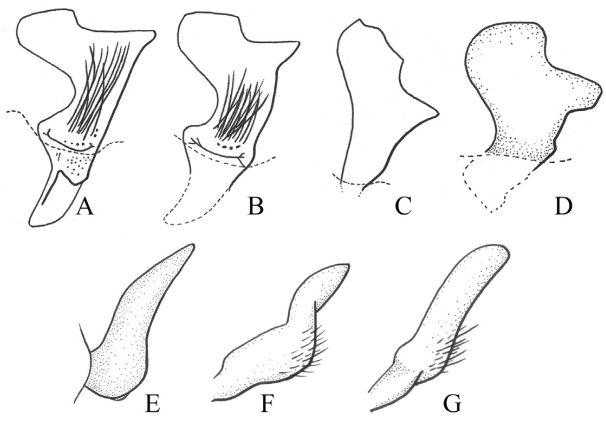

Figure 8. Male parameres of *Platyvelia* spp. (A–D) *Platyvelia annulipes* species group, (A) *P. alvaradana*, (B) *P. verana*, (C) *P. annulipes*, (D) *P. summersi*. (E–G) *Platyvelia brachialis* species group, (E) *P. beameri*, (F) *P. brachialis*, (G) *P. maritima*. Figures A–C from Drake and Hottes (1952), Figure E from Hungerford (1929a).

shiny longitudinal midline, with two shiny oblique indentations near base. Antenna brown, antennomeres III–IV missing. Eye dark-brown. Articles I–III of labium yellowish-brown; article IV hidden. Pronotum brown on center of anterior lobe and on posterior lobe, dark-brown on anterior margin and sides of anterior lobe, sided by small patches of silverish setae (Fig. 3A). Pleural region of thorax and each acetabulum mostly dark-brown, with scattered area of reddish-brown; areas of silverish setae located dorsally to pro- and mesoacetabula and posterodorsally to metacetabulum (Fig. 3C). Prosternum and mesal surface of proacetabulum orangish-brown. Coxae and trochanters yellow, except mesocoxa yellowish-brown. Fore femur yellow on proximal half; distal half brown with narrow yellow band on middle and small apical yellow mark. Middle and hind femora with proximal yellow area much shorter, with same yellow marks on distal half. Tibiae brown, each with narrow yellow band close to base and wider yellow band approximately at middle. Tarsi brown with dark-brown apexes, except tarsomere II of middle leg yellowish. Abdominal mediotergites I–VI brown, with scattered areas of light-brown; silverish setae on midline of posterior region of segment IV, throughout V, laterally and on a small patch on middle of anterior margin of VI, and laterally on posterior half of VII. Abdominal laterotergites brown to reddish-brown, with small silverish patches on posterolateral angles of all segments except VII (Fig. 3A). Side of abdomen with patch of silverish setae on all segments (Fig. 3C). Abdominal sterna orangish-brown centrally, darker laterally (Fig. 3B).

Body dorsally velvety, densely covered by short, shiny, decumbent setae. Longer setae present in front of eye, adjacent to mesal eye margin, buccula, jugum, base of labium, side of body, proepisternum, and posteriorly on terminal abdominal terga. Head inserted into concave anterior margin of pronotum. Antennomere I thickest, slightly wider on apex, curved laterally; II thinner, about half of length of I; III–IV missing. Ocular setae absent. Buccula with three circular punctures close to ventral margin. Pronotum with lateral margin almost continuously rounded, very slightly constricted between lobes; posterior margin broadly rounded; median carina very weak, more perceptible on anterior region of posterior lobe. Continuous row of circular punctures adjacent to anterior margin of pronotum; a pair of deeper punctures between anterior and posterior lobes; posterior lobe with several tiny scattered punctures. Posterolateral area of metanotum narrowly exposed. Pleural region of thorax with several circular punctures, mainly on posterior margin of propleuron and anterior margin of mesopleuron; lateral surface of acetabula with few smaller punctures. Meso- and metasterna hidden by glued card. Legs covered by decumbent brown setae; femora also with longer curved setae, especially on posterior surface; tibiae also with longer straight setae. Flexor surface of fore femur with few spine-like black setae. Fore tibia, middle femur, and hind trochanter, femur, and tibia with several black spinules; middle and hind femora also with some more robust and slightly longer curved spines. Abdominal mediotergites I–VI transversely rectangular, VII longitudinally rectangular. Abdominal sternum VI with a triangular projection extending over anterior third of VII; lateral margin of projection poorly convex (Fig. 6B). Abdominal segment VIII elevated centrally in dorsal view, with broadly rounded posterior margin; ventrally, with posterior margin convex. Paramere tightly appressed to proctiger, shape as in Fig. 8C.

Discussion. Champion (1898) described *Velia annulipes* based on two apterous males, one from Mexico (NHMW) and one from Guatemala (BMNH), but did not designate the holotype. Drake and Hottes (1952) examined the syntype from Mexico and proposed the new species *V. verana* based mainly on the shape of the paramere. Polhemus and

Figure 9. *Platyvelia beameri*, (A) micropterous male, dorsal habitus, (B) micropterous female, dorsal habitus, (C–D) macropterous male, (C) dorsal habitus, (D) ventral habitus, (E) macropterous female, dorsal habitus, (F) macropterous male, lateral habitus.

Polhemus (1993) transferred these species to *Platyvelia*, and both are currently valid. Thus, the syntype of *P. annulipes* from Guatemala is herein designated as lectotype. This act will maintain the species name stability, since the type series consists of two valid species. Here, we examined both syntypes, also considering them as distinct. They are distinguished by the projection of the male abdominal sternum VI. In *P. annulipes*, this projection does not reach the posterior margin of sternum VII and has convex apex (Fig. 6B), whereas in *P. verana* it exceeds the posterior margin of sternum VII and has truncated apex (Fig. 6D). The projection is similar between *P. annulipes* and *P. summersi*, where both have a slightly tapered apex, but in the first it does not extend over the sternum VII (Fig. 6B), which occurs in the latter (Fig. 6C). Thus, only the male lectotype and its respective type locality (Fig. 7) are known so far for *P. annulipes*.

Type material examined. Lectotype herein designated, apterous male (BMNH), Guatemala City, Champion, B.C.A. Rhyn. II, Velia annulipes Ch., Velia annulipes Champion 1898, p142–143, sp. figured, NHMUK 013585753.

Figure 10. *Platyvelia brachialis*, holotype, macropterous male (NHRS), (A) dorsal habitus, (B) ventral habitus, (C) lateral habitus. Photographed by G. Lindberg (© 2021 Naturhistoriska Riksmuseet). Made available by the Swedish Museum of Natural History under Creative Commons Attribution 4.0 International Public License, CC-BY 4.0, https://creativecommons.org/licenses/by/4.0/legalcode.

Platyvelia summersi (Drake, 1951)

(Figs. 1F, 4, 6C, 7, 8D)

Velia summersi Drake, 1951: 371–372 (original description);

Paravelia summersi; Polhemus 1976: 513 (changed combination);

Platyvelia summersi; Polhemus and Polhemus 1993: 394 (changed combination).

Redescription. Apterous male, BL 5.82; HW 0.98; ANT I 1.51, ANT II 0.71, ANT III 0.83, ANT IV 0.68; EYE 0.30; PL 1.60; PW 1.74; FORELEG: FEM 2.14, TIB 1.49, TAR I 0.15, TAR II 0.16, TAR III 0.47; MIDLEG: FEM 2.54, TIB 2.55, TAR I lost, TAR II lost, TAR III lost; HINDLEG: FEM 2.38, TIB 2.70, TAR I 0.09, TAR II 0.45, TAR III 0.62.

Head brown, darker along impressed shiny longitudinal midline, with two shiny oblique indentations near base. Antenna brown, distal half of antennomere II dark-brown; antennomere IV light-brown. Eye silverish. Articles I–III of labium yellowish, base of III brown; IV shiny black. Pronotum dark-brown on sides of anterior lobe. Pleural region of thorax and lateral surface of acetabula mostly dark-brown; center of mesoacetabulum dark; large area of silverish setae located dorsally to acetabula. Prosternum and mesal surface of acetabula orangish-brown. Metasternum dark-brown. Coxae and trochanters yellow, apex of middle trochanter brown. Fore femur yellow on proximal half; distal half brown with narrow yellow band at middle and small preapical yellow mark. Middle and hind femora with proximal yellow area much shorter, with same yellow mark on distal half. Tibiae dark-brown, each with narrow yellow band close to base and wider yellow band approximately at middle. Tarsi brown with dark-brown apexes. Abdomen reddish-brown; posterior and lateral margins of mediotergite VII lighter; silverish setae located on central anterior region of mediotergites II–VI, laterally on mediotergites V–VI, and on side of abdomen (Fig. 4A). Abdominal laterotergites with small silverish patch on posterolateral angle of all segments except last (Fig. 4A).

Head and body dorsally velvety, densely covered by short, shiny, decumbent setae. Longer setae present on clypeus, adjacent to mesal eye margin, base of labium, and posteriorly on last abdominal segment and terminalia. Head strongly inserted into concave anterior margin of pronotum. Antennomere I about twice as wide as II, lateral margins diverging to apex, curved laterally; II–IV with subequal width; II–III cylindrical; IV fusiform. Ocular setae absent. Buccula with one circular puncture close to ventral margin. Small black denticles present on jugum and adjacent portion of proepisternum, absent from acetabula and

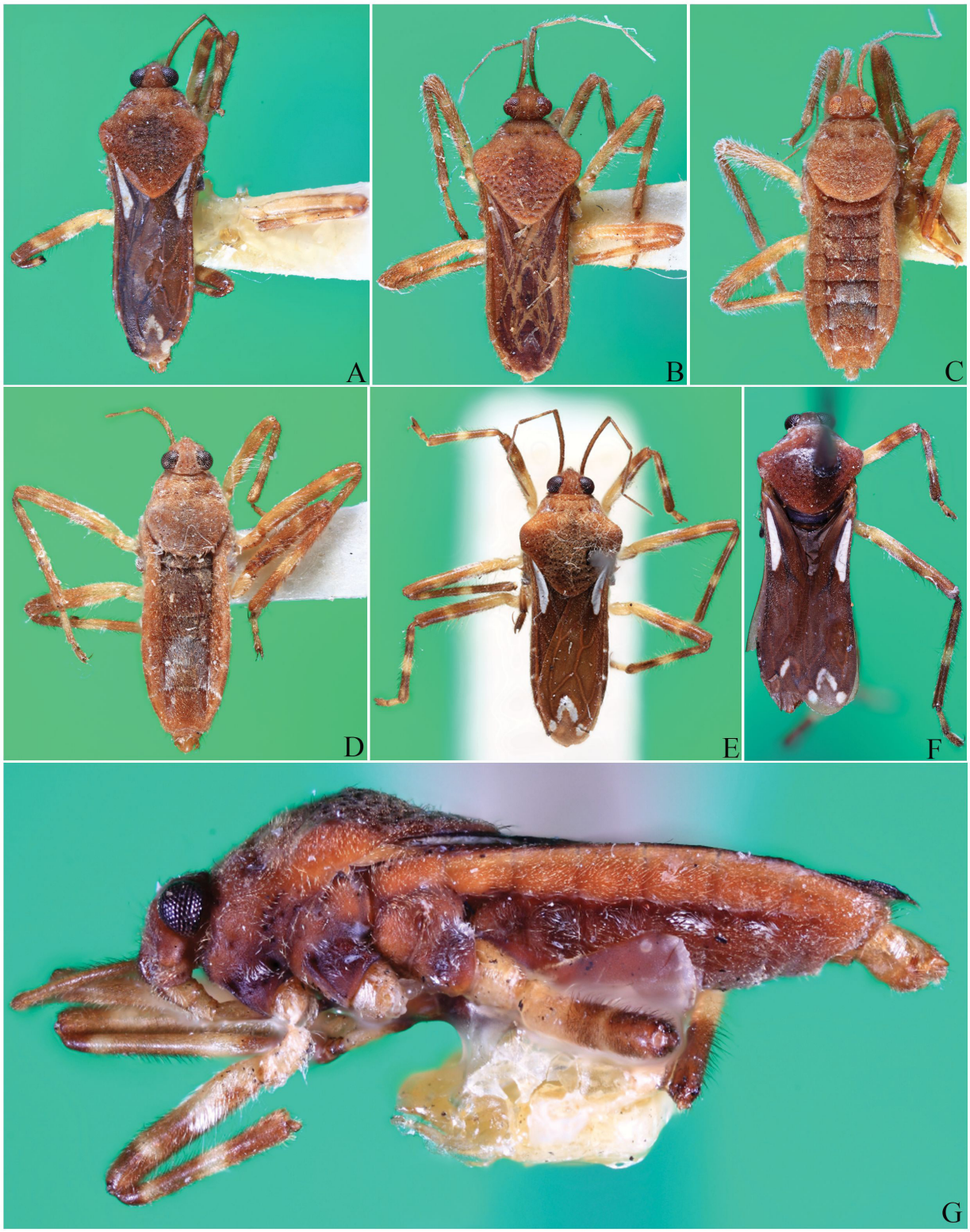

Figure 11. *Platyvelia brachialis*, (A) holotype of *P. egregia* **n. syn.**, macropterous male, dorsal habitus (NMNH), (B) allotype of *P. egregia* **n. syn.**, macropterous female, dorsal habitus (NMNH), (C) apterous female, dorsal habitus, (D) micropterous male, dorsal habitus, (E) holotype of *P. verdica* **n. syn.**, macropterous female, dorsal habitus (NMNH), (F) paratype of *P. verdica* **n. syn.**, macropterous male, dorsal habitus (NMNH), (G) holotype of *P. egregia* **n. syn.**, macropterous male, lateral habitus (NMNH).

abdominal sterna; labium surpassing middle of mesosternum. Pronotum with lateral and posterior margins almost continuously rounded, lateral margin very slightly constricted between lobes; longitudinal median carina very weak, more perceptible on posterior region of anterior lobe. Continuous row of circular punctures adjacent to anterior margin of pronotum; a pair of deeper punctures between anterior and posterior lobes; posterior lobe with several tiny scattered punctures. Pleural region of thorax with several circular punctures, mainly on posterior margin of propleuron and anterior margin of mesopleuron; central dorsal area of propleuron with one larger puncture; lateral surface of

Figure 12. *Platyvelia maritima*, paratype, apterous male (NMNH), (A) dorsal habitus, (B) ventral habitus, (C) lateral habitus.

acetabula with few smaller punctures. Mesosternum longitudinally impressed centrally. Mesoacetabulum with a large, deep puncture on posteromesal surface, with posterior margin extending centrally to form a tubercle that touches another one projecting from anterolateral portion of metasternum. Legs covered by decumbent brown setae; femora also with longer curved setae, especially on posterior surface; tibiae also with longer straight setae; middle tibia with a row of very long thin setae starting before middle. Flexor surface of fore femur with few spine-like black setae. Fore tibia, middle femur, and hind trochanter, femur, and tibia with several black spinules; middle and hind femur also with some more robust and slightly longer curved spines. Abdominal mediotergites transversely rectangular, except VII subquadrate with posterior margin emarginated centrally (Fig. 4A). Abdominal sternum II laterally compressed; III–V centrally depressed; VI with a large triangular projection extending over VII, with lateral margins tapering posteriorly, forming a pointed apex; posterolateral margin of abdominal segment VII with robust black denticles; these absent from segment VIII. Abdominal tergum VIII elevated centrally, with broadly rounded posterodorsal margin; flattened ventrally, with convex posterior margin a little extended over pygophore. Paramere flat, tightly appressed to proctiger, shape as in Fig. 8D.

Discussion. This species can be distinguished from congeners for having the projection of the male abdominal sternum VI tapering posteriorly, forming a pointed apex (Fig. 6C). Also, its paramere has a different shape (compare Figs. 8A–D). The non-type material mentioned below is the same studied by Polhemus (1973). This species is known only from Arizona, southwestern region of the United States of America (Fig. 7).

Type material examined. Holotype, macropterous female (NMNH), United States, Arizona, Oak Creek Canyon, F. H. Snow.

Additional material examined. 1 apterous male, 1 apterous female, 1 macropterous female (NMNH), United States, Arizona, Sedona, Oak Creek Canyon, 9.VI.1969, CL1211, J. T. Polhemus.

Platyvelia verana (Drake and Hottes, 1952)
(Figs. 5, 6D, 8B)

Velia verana Drake and Hottes, 1952: 87 (original description);
Paravelia verana; Polhemus 1976: 513 (changed combination);
Platyvelia verana; Polhemus and Polhemus 1993: 394 (changed combination).

Redescription. Micropterous male, holotype, BL 5.0; HW 0.95; ANT I 1.46, ANT II 0.89, ANT III and IV broken off; EYE 0.28; PL 1.39;

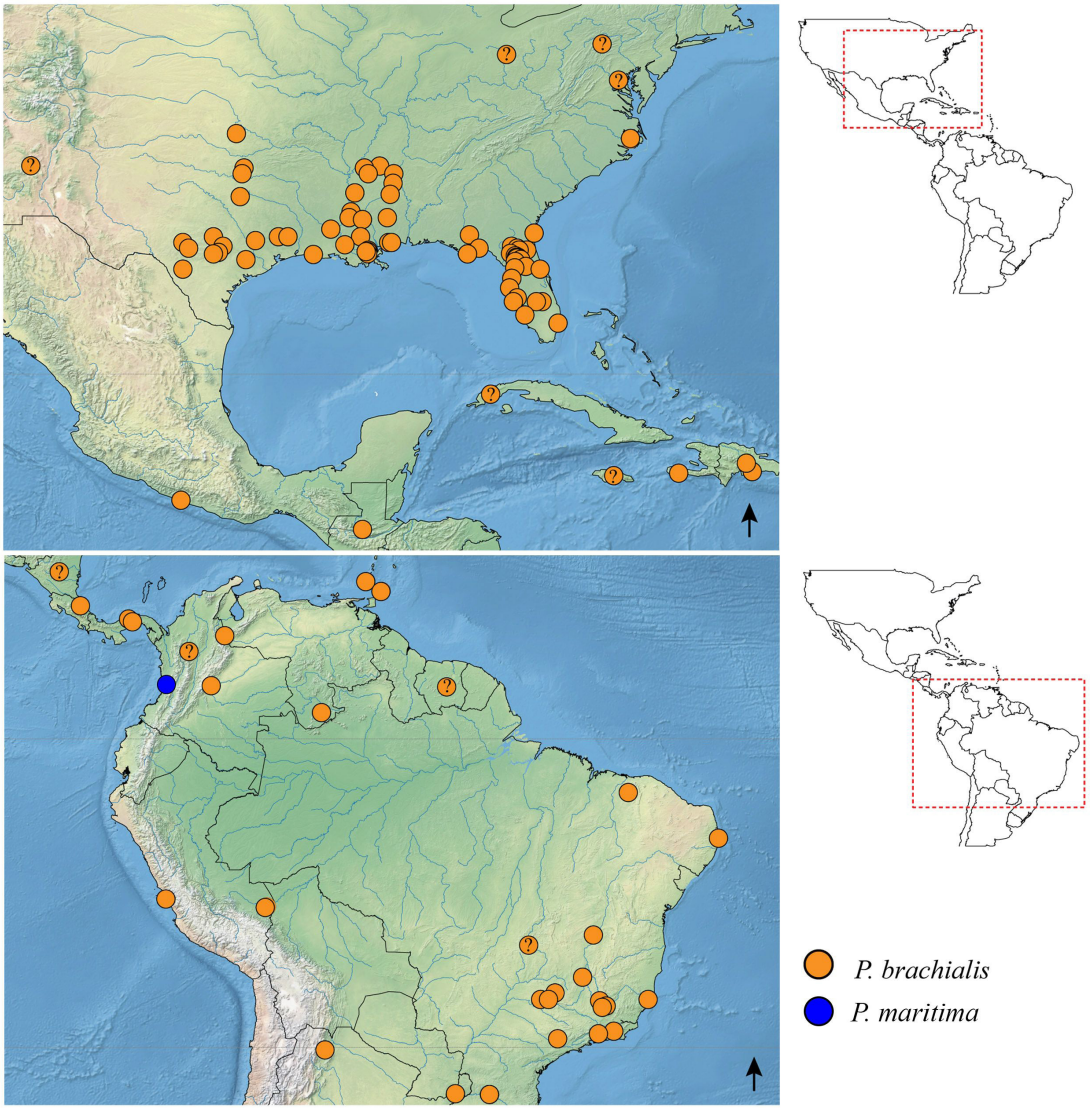

Figure 13. Distribution records of *Platyvelia brachialis* and *P. maritima*.

PW 1.50; FORELEG: FEM 1.81, TIB 1.92, TAR I 0.08, TAR II 0.16, TAR III 0.42; MIDLEG: FEM 2.50, TIB 2.54, TAR I 0.08, TAR II 0.56, TAR III 0.52; HINDLEG: FEM 2.36, TIB 2.52, TAR I 0.11, TAR II 0.40, TAR III 0.52.

Head chestnut-brown, inconspicuously darker along impressed shiny longitudinal midline, slightly paler ventrally, with two shiny oblique impressions near base. Antennomeres I and II yellowish, the extreme apex of II slightly brown infuscated. Eye silverish. Labium yellow; apex black. Pronotum chestnut-brown, slightly darker on side of anterior lobe, with a pair of small patches of silverish setae at the depression behind anterior lobe (Fig. 5A). Pleural region of thorax including lateral surface of each acetabula medium-brown, some small areas darker brown; large areas of silverish setae located dorsally to pro- and mesoacetabula and posterodorsally to metacetabulum (Fig. 5C). Pro-, meso-, and metasterna, and mesal surface of each acetabula light-brown. Wing of micropterous morph pearly-white. Coxae and trochanters yellow. Fore femur yellow on proximal half; distal half pale-brown with narrow yellow band on middle and small apical yellow mark. Middle and hind femora similar, except proximal yellow area much shorter. Tibiae pale brown, each with narrow yellow band close to base and wider yellow band at base of distal half. Tarsomeres yellow, each apically brown. Abdominal mediotergites I–VII uniformly chestnut-brown; IV–VI with scattered silverish setae at posterior margin, V–VII on wide lateral area; VIII posteriorly with a pair of small lateral patches of silverish setae. Laterotergites chestnut-brown, slightly paler on VII; narrow margins on V–VII infuscated; with small silverish patch on posterolateral angle of all segments except last (Fig. 5A). Side of abdomen with large patch of silverish setae on all segments. Abdominal sterna orangish-brown medially, darker brown laterally.

Head and body dorsally velvety, covered by short, shiny, decumbent setae. Longer setae present in front of eye, adjacent to mesal eye margin, buccula, jugum, base of labium, side of body, proepisternum, posterolaterally on abdominal segment VII, and terminalia. Head strongly inserted into concave anterior margin of pronotum. Antennomere I twice as wide as II, slightly curved. Ocular setae absent. Buccula with 3–4 circular punctures close to ventral margin. Small black denticles present on anteromesal corner of proepisternum; absent from acetabula and abdominal sterna I–VI. Labium reaching posterior margin of mesosternum. Pronotum with slightly elevated humeri, hardly constricted between lobes; posterior margin broadly rounded; median carina weakly perceptible on anterior region of posterior lobe; posteromedial area of anterior lobe distinctly swollen. Continuous row of circular punctures adjacent to anterior margin of pronotum; a

pair of groove-like punctures between anterior and posterior lobes; posterior lobe with numerous large scattered punctures. Side of thorax with several circular punctures, mainly on posterior margin of propleuron and anterior margin of mesopleuron; mediodorsal area of propleuron with one larger puncture; lateral surface of each acetabula with few punctures of varying size. Mesosternum medially impressed. Mesoacetabulum with a large, deep puncture on posteromesal surface, with posterior margin extending centrally to form a rounded tubercle that touches a sharper one projecting from anterolateral portion of metasternum. Wing of micropterous morph small, club-shaped, not reaching abdominal mediotergite I. Legs covered by decumbent brown setae; femora also with longer curved setae, especially on flexor side; tibiae also with longer straight setae; middle tibia with a row of very long thin setae at distal third of flexor side. Flexor surface of fore femur and fore tibia with numerous spine-like black setae. Middle femur, and hind trochanter, femur, and tibia with several black spinules. Abdominal mediotergites transversely rectangular, except VII subquadrate with concave posterior margin. Abdominal sternum II laterally compressed; III–V centrally weakly depressed; VI with a large triangular projection extending over hind margin of VII; lateral margins of projection convergent, apex truncate (Fig. 6D). Posterolateral margin of abdominal segment VII and segment VIII without denticles. Abdominal segment VIII dorsally with a short subapical median carina and depressions on both sides, so that the entire apical area appears swollen; ventrally with a broad transverse impression and a short posteromedial lobe. Pygophore elongated, raised in front of paramere insertion and with rectangular posterolateral corners. Proctiger slender, 1.6 times as long as wide; posteromedially strongly elevated. Paramere distally bilobed, the anterior lobe truncated, the posterior one acute (Figs. 5C insert, 8B).

Discussion. This species was described based on one of the two male specimens of the type series of *V. annulipes* (Drake and Hottes, 1952). The authors considered the shape of the paramere as diagnostic to propose it as a new species. In addition to the paramere, *P. verana* differs from *P. annulipes* by the projection of the male abdominal sternum VI. In *P. verana*, the projection is truncated posteriorly and exceeds the posterior margin of sternum VII (Fig. 6D), whereas in *P. annulipes* the projection tapers slightly towards the apex and does not exceed the posterior margin of sternum VII (Fig. 6B). The shape of the projection is similar between *P. verana* and *P. alvaradana*, but these species are separated by the antennomere II and the body length. In *P. verana*, antennomere II is yellowish-brown (Figs. 5A, 5C) and the body is 5.0 mm long, whereas in *P. alvaradana* antennomere II has a yellow band at mid-length (Figs. 2A–C) and the body is 5.6 mm long. Drake and Hottes (1952) mentioned only "Mexico" for the type locality. Because only the name of the country is mentioned, it was not possible to include a geographic record on our map.

Type material examined. Holotype, micropterous male (NHMW), Mexico, coll. Signoret, paralectotype of Velia annulipes, Velia verana Type D & H, left paramere mounted on slide, NHMW-Hemiptera-Inv. No. 14 427.

Platyvelia brachialis species group

This species group is characterized by the absence of a median projection on the male abdominal sternum VI, posterior margin of the male abdominal sternum VII distinctly concave (Fig. 1E), and paramere elongate, not sculptured (Figs. 8E–G). This group includes the type species of the genus, *P. brachialis*, which is distributed from northeastern United States to southern Brazil (Fig. 13). In turn, *P. beameri* and *P. maritima* have more restricted distributions, occurring on southwestern United States (Fig. 7) and on the Colombian Pacific coast (Fig. 13), respectively.

Key to the species of the *P. brachialis* species group

1. Anterior margin of pronotum distinctly wider than head width through eyes, with anterolateral corners slightly projected (Figs. 9A–C, 9E); body length 6.5–7.0 ..... ***Platyvelia beameri***

1'. Anterior margin of pronotum narrower than or subequal to head width through eyes, with anterolateral corners not projected (Figs. 10A, 11A–F); body length 4.0–5.1 2

2. Monomorphic apterous; angulate metanotal projections exposed (Fig. 12A); paramere with lateral margins parallel or slightly converging, apex rounded (Fig. 8G); body length 4.00–4.10 ... ***Platyvelia maritima***

2'. Polymorphic apterous, micropterous, or macropterous; in apterous or micropterous specimens, angulate metanotal projections not exposed (Figs. 11C–D); paramere slightly constricted at mid-length, tapering towards apex (Fig. 8F); body length 4.50–5.10 ..... ***Platyvelia brachialis***

Platyvelia beameri (Hungerford, 1929a)

(Figs. 1A-E, 7, 8E, 9)

Velia beameri Hungerford 1929a: 759–761 (original description);

Paravelia beameri; Polhemus 1976: 512 (changed combination);

Platyvelia beameri; Polhemus and Polhemus 1993: 394 (changed combination).

Discussion. Males of *P. beameri* can be separated from *P. brachialis* and *P. maritima* by the body length between 6.5 and 7.0 mm, the anterior margin of the pronotum distinctly wider than the head width through the eyes, with the anterolateral corner projected (Figs. 9A-C, E), and the paramere with distolateral margins converging to apex, not emarginate at mid-length (Fig. 8E). In turn, *P. brachialis* and *P. maritima* are shorter than 5.5 mm, have the anterior margin of the pronotum narrower than or subequal to the head width through the eyes, with the anterolateral corner not projected (Figs. 10A, 11A-F, 12A), and have parameres with different shapes (Figs. 8F, 8G). *Platyvelia beameri* was described based on a pair of apterous specimens deposited at the Snow Entomological Museum Collection, Lawrence, U.S.A. In the present study, we did not have the opportunity to examine the types, therefore we chose not to present a redescription for the species. However, the material examined herein is the same studied by Polhemus (1973), who compared it with the holotype.

Material examined. 18 apterous males, 10 apterous females, 1 macropterous female, 4 nymphs, (NMNH), United States, Arizona, 5 miles Northeast of Castle Hot Springs, CL312, 7.X.1964, J. T. Polhemus.

Platyvelia brachialis (Stål, 1860)

(Figs. 8F, 10, 11, 13)

Velia brachialis Stål, 1860: 82 (original description);

Paravelia brachialis; Polhemus 1976: 512 (changed combination);

Platyvelia brachialis; Polhemus and Polhemus 1993: 394 (changed combination);

= *Platyvelia australis* (Torre-Bueno, 1916: 54–55) (synonymized by Blatchley 1926: 1002);

= *Platyvelia egregia* (Drake and Harris, 1935: 192–193) (**new synonym**);

= *Platyvelia verdica* (Drake, 1951: 373–374) (**new synonym**).

Redescription. Macropterous male holotype of *P. brachialis*, BL 4.46, PW (across humeral angles) 1.70. Head orangish-brown with shiny impressed longitudinal midline and two oblique indentations near base. Antennae missing. Eye dark reddish-brown. Labium with articles I–III yellowish-brown; IV shiny dark-brown. Pronotum orangish-brown, darker on center of posterior lobe (Fig. 10A). Side and venter of thorax orangish-brown. Acetabula brown to orangish-brown on lateral surface, yellowish-brown on mesal surface, each with a small patch of

silverish setae located posteriorly to lateral surface. Fore wings brown to dark-brown, each with lighter veins; when closed, with a pair of roughly triangular proximal white maculae starting on humeral angle and surpassing apex of pronotum, and three distal white maculae – central one roughly arrow-like, other two with irregular shape, placed more laterally, and almost reaching apex of wing (Fig. 10A). Coxae and trochanters yellow. Femora yellow on proximal half, distal half brown, each with preapical yellow band. Tibiae brown, each with yellow band close to base and another on middle. First tarsomere of fore and middle legs brown, remaining of tarsi missing. Abdominal laterotergites brown with silverish areas on posterolateral angle of segments IV–VII. Abdominal sterna orangish-brown to reddish-brown, laterally with a small patch of silverish setae on segments II–VI (Fig. 10C).

Body covered by short shiny setae; longer brown setae present in front of eye, adjacent to mesal eye margin, and on lateral margin of pronotum and abdominal laterotergites. Ocular setae absent. Buccula with two small circular punctures. Jugum and adjacent portion of proepisternum with some black denticles. Labium surpassing middle of mesosternum. Pronotum subpentagonal, slightly constricted between lobes, with incipient longitudinal median carina, more visible on posterior lobe, and obtusely elevated humeri; continuous row of circular punctures adjacent to anterior margin; a pair of deeper punctures between anterior and posterior lobes; posterior lobe with several tiny scattered punctures. Side of thorax with scattered circular punctures. Very few black denticles visible on lateral surface of metacetabulum and first abdominal segment. Pro- and mesoacetabula and most thoracic sterna without black denticles. Mesosternum longitudinally impressed centrally. Mesoacetabulum with a large, deep puncture on posteromesal surface, with posterior margin extending centrally to form a tubercle that touches another one projecting from anterolateral portion of metasternum. Fore wing leaving only the edge of laterotergites exposed, reaching terminalia, covered by setae on proximal and lateral portions. Legs covered by decumbent brown setae; femora also with longer curved setae, especially on posterior surface; tibiae also with longer straight setae; middle tibia with a row of very long thin setae starting before middle. Femora with patches of silverish setae on proximal half of flexor surface. Posterior surface of fore femur with numerous short spine-like black setae. Flexor surfaces of fore tibia, and hind femur and tibia armed with short black spinules; middle femur with few short black spinules on posterior third. Fore tibia slightly wider and concave on apex. Abdominal sterna II–VII covered by long, thin, light setae, especially laterally, without carina, projections or black denticles. Abdominal sternum VII with posterior margin concave (Fig. 10B).

Macropterous male holotype of *P. egregia*, BL 5.05; HW 0.80; ANT I 1.13, ANT II 0.70, ANT III lost, ANT IV lost; EYE 0.25; PL 1.81; PW 1.80; FORELEG: FEM 1.35, TIB 1.18, TAR I 0.13, TAR II lost, TAR III lost; MIDLEG: FEM 1.81, TIB 1.95, TAR I 0.10, TAR II 0.46, TAR III 0.41; HINDLEG: FEM 1.68, TIB 1.90, TAR I 0.10, TAR II 0.33, TAR III 0.40.

Head orangish-brown with shiny impressed longitudinal midline and two oblique indentations near base. Antennomeres I–II light-brown to brown. Eye dark reddish-brown. Labium with articles I–III yellowish-brown; IV shiny dark-brown. Pronotum orangish-brown, darker on center of posterior lobe (Fig. 11A). Side and venter of thorax orangish-brown; a small patch of silverish setae located posteriorly to lateral surface of metacetabulum. Acetabula each brown to dark-brown on lateral surface, yellowish-brown on mesal surface. Fore wing opaque brown, with concolorous veins; a roughly triangular proximal white macula starting on humeral angle and surpassing apex of pronotum, and three distal white maculae – central one roughly arrow-like, other two with irregular shape, placed more laterally, and reaching apex of wing (Fig. 11A). Coxae and trochanters yellow. Fore and hind femora yellow on proximal half; distal half brown, each with preapical yellow band. Middle femur brown with yellow band before middle and other closer to apex. Tibiae brown, each with yellow band close to base and other on middle. Tarsi light-brown to brown. Abdominal laterotergites brown, with silverish area on posterolateral angle of segments IV–VI. Abdominal sterna orangish-brown to reddish-brown, laterally with a small patch of silverish setae on segments VI–VII.

Body covered by short shiny setae; longer brown setae present in front of eye, adjacent to mesal eye margin, and on lateral margins of pronotum and laterotergites. Antennomeres I–II covered by short brown setae, with rows of longer thicker setae. Ocular setae absent. Buccula with two small circular punctures. Jugum and adjacent portion of proepisternum with several black denticles. Labium surpassing middle of mesosternum. Pronotum subpentagonal, slightly constricted between lobes, with incipient longitudinal median carina, more visible on posterior lobe, and obtusely elevated humeri; continuous row of circular punctures adjacent to anterior margin; a pair of deeper punctures between anterior and posterior lobes; posterior lobe with several tiny scattered punctures. Side of thorax with scattered circular punctures. Very few black denticles visible on lateral surface of metacetabulum and first abdominal segment. Pro- and mesoacetabula and most thoracic sterna without black denticles. Mesosternum longitudinally impressed centrally. Mesoacetabulum with a large, deep puncture on posteromesal surface, with posterior margin extending centrally to form a tubercle that touches another one projecting from anterolateral portion of metasternum. Wing leaving only the edge of laterotergites exposed, reaching the middle of terminalia, covered by setae on proximal and lateral portions. Legs covered by decumbent brown setae; femora also with longer curved setae, especially on posterior surface; tibiae also with longer straight setae; middle tibia with a row of very long thin setae starting before middle. Femora each with patch of silverish setae on proximal half of flexor surface. Posterior surface of fore femur with numerous short spine-like black setae. Flexor surfaces of fore tibia, and hind femur and tibia armed with short black spinules. Fore tibia slightly wider and concave on apex. Abdominal mediotergites transversely rectangular, except VII subquadrate with posterior margin slightly rounded. Abdominal sterna II–VI covered by long, thin, light setae, especially laterally, without carina, projection or black denticles. Posterolateral margin of abdominal segment VII and anterior portion of VIII with black denticles; these thicker and more densely packed on VII. Proctiger without dorsal projection. Paramere slightly constricted at mid-length, curved and tapering towards apex (Fig. 8F).

Macropterous female holotype of *P. verdica*, BL 4.80; HW 0.83; ANT I 1.11, ANT II 0.63, ANT III 0.63, ANT IV 0.73; EYE 0.30; PL 1.75; PW 1.75; FORELEG: FEM 1.50, TIB 1.25, TAR I 0.08, TAR II 0.10, TAR III 0.30; MIDLEG: FEM 1.78, TIB 1.90, TAR I 0.10, TAR II 0.48, TAR III 0.53; HINDLEG: FEM 1.78, TIB 1.90, TAR I 0.10, TAR II 0.25, TAR III 0.40.

Head orangish-brown, darker on frons, with impressed longitudinal median line and a pair of oblique indentations near base shiny. Antenna brown, lighter on middle of antennomere II and intersegmental pieces. Eye shiny dark-red. Clypeus dark-brown. Labium yellowish-brown with shiny brown distal article. Pronotum orangish-brown, darker on a pair of small lateral depressions on posterior area of anterior lobe and on center of posterior lobe; few silverish setae on depressions of anterior lobe (Fig. 11E). Side of thorax orangish- brown; brown on posterior area of propleuron. Lateral surface of acetabula brown, each with patch of silverish setae; mesal surface orangish-brown. Prosternum orangish-brown. Meso- and metasterna dark-brown. Fore wing opaque brown, with entirely dark-brown costa, other veins dark-brown for proximal third of length, then lighter brown; a white macula starting on humeral angle and distinctly surpassing apex of pronotum; three more maculae distally, central one arrow-like and two rounded lateral maculae closer to apex (Fig. 11E). Coxae, trochanters, and most

of venter of femora yellow. Dorsum of fore femur yellow on proximal half, distal half brown with small preapical and apical yellow maculae. Fore and middle tibiae brown, each with small proximal yellow macula and median yellow band. Middle and hind femora yellow on proximal third to half, distally brown, each with median yellow macula. Hind tibia brown, with small yellow maculae near base and preapically, plus median yellow band. Tarsi brown, darker at apexes. Exposed portion of abdominal laterotergites dark brown, with small patch of silverish setae on posterior angles of five segments, fainter anteriorly. Side and venter of abdomen orangish-brown, with darker area on posterior margin of each sternum.

Head velvety, with longer setae in front of eye. Antenna covered by decumbent brown setae, with longer curved setae on antennomeres I–III and few thin setae on IV. Antennomere I thickest, slightly wider on apex, curved laterally; II–III cylindrical; II broader than III; IV fusiform, as broad as III. Ocular setae absent. Antenniferous tubercle swollen. Buccula without punctures or black denticles. Jugum and adjacent portion of proepisternum with several robust black denticles. Labium surpassing middle of mesosternum. Pronotum subpentagonal, slightly constricted between lobes, with incipient longitudinal median carina, more visible on posterior lobe, and obtuse elevated humeri; continuous row of circular punctures adjacent to anterior margin of pronotum; a pair of deeper punctures between anterior and posterior lobes; posterior lobe with several tiny scattered punctures. Pleural region of thorax with scattered circular punctures. Black denticles present on pro-, meso- and metapleura, lateral surfaces of meso- and metacetabula, mesal surface of metacetabulum, metasternum, side of abdominal segments I–III, and all abdominal sterna, more robust and restricted to posterolateral margin on sternum VII. Mesosternum longitudinally impressed centrally. Mesoacetabulum with a large, deep puncture on posteromesal surface, with posterior margin extending centrally to form a tubercle that touches another one projecting from anterolateral portion of metasternum. Fore wing leaving only edge of abdominal laterotergites exposed, almost reaching apex of terminalia, covered by setae on proximal and lateral portions. Legs covered by decumbent brown setae; femora each with longer curved setae, especially on posterior surface; tibiae each with longer straight setae; middle tibia with a row of very long thin setae starting before middle. Femora each with patch of silverish setae on proximal half of anterior and posterior surfaces. Flexor surface of fore femur with several short spine-like black setae. Flexor surfaces of fore tibia and hind trochanter, femur and tibia armed with short black spinules. Fore tibia slightly wider and concave on apex. Abdominal sterna covered by long, thin, light setae, especially laterally, without carina or projection.

Discussion. The synonymy between *P. brachialis* and *P. egregia* is herein proposed based mainly on characteristics observed on the male holotype and a slide-mounted paramere of a paratype of the latter species. Such fact had already been hypothesized by Polhemus and Polhemus (1993), who studied long series of *P. brachialis* from a wide geographical range and noticed variation in somatic and genital structures, but could not consistently separate populations from North and South America. Based on the holotype and available information and images of *P. brachialis* (e.g. Polhemus and Polhemus, 1993; Epler, 2006), and examination of specimens from different collections throughout time, it is possible to affirm that *P. egregia* falls within the morphological range of the former.

Somatic features that apparently vary in a random way in *P. brachialis*, sometimes even among specimens from the same locality, include the presence and size of silverish areas on anterolateral portion of pronotum, sides of body and proximal half of femora, distribution of black spinules on sides and venter of thorax and abdomen, number and thickness of the black spinules of the legs, and presence of black spinules on posterior surfaces of middle femur and hind trochanter. Color patterns of wing maculae of macropterous individuals, leg markings, and silverish areas on abdominal mediotergites of non-macropterous forms, however, are nearly constant. Parameres can vary subtly between individuals and populations, but their general shape is always similar. It seems that even Drake had problems on separating *P. egregia* from *P. brachialis*. A slide-mounted paramere of a specimen from Nova Teutônia, southern Brazil, identified as *P. egregia* by him was found in the NMNH. This paramere is probably the same drawn by Polhemus and Polhemus (1993: Fig. 3) and identified as *P. brachialis* in their study. These authors examined material from the NMNH and indicated the same locality on the figure legend.

Apart from small differences in leg coloration, other features observed on the holotype of *P. verdica* have been seen in specimens identified as either *P. brachialis* or *P. egregia* from different localities and collections. Therefore, we consider that the female above is just part of the range of variation in color and structure of *P. brachialis*, the three species names being synonyms, as well as *P. australis*. The synonymy between *P. verdica* and *P. brachialis* had already been suggested as possible by Nieser and Melo (1997), but not confirmed because types were not available to them. In their identification key, only a minor difference in antennal proportions was indicated to distinguish the two species, both described from southeastern Brazil.

Determining females as holotypes in this group is unusual, and Drake (1951) probably did it because the only male paratype is severely damaged (Fig. 11F). The definition of the two specimens as representatives of a single and new species by him, however, seems to be derived solely from the relative proximity of collecting localities, because they differ in several minor aspects considered important in his description. Besides that, *P. verdica* was not compared with *P. brachialis* in the original description, but only with *Paravelia hungerfordi* (Drake and Harris, 1933), and no characteristics of the male terminalia were mentioned. They have been checked for the present study and agree with those of *P. brachialis*, including the shape of parameres.

Considering that almost no details about these species were available on literature, the data about *Platyvelia* from South America published so far probably results from random identifications as *P. brachialis*, which seems to be indeed the most widespread species in the continent (Fig. 13). The only exception is *P. maritima*, which is restricted to the Pacific Coast of Colombia and was sufficiently well described by its authors, eliminating the risk of confusion. After examination of type specimens and additional material, we do not rule out the possibility of the existence of cryptic species within *P. brachialis*. The systematic study of different populations along the distribution of the species, combined with molecular tools, may or may not support this hypothesis.

Type material examined. Holotype of P. *brachialis*, macropterous male (NHRS), Brasil, F. Sahlb., 97/84, Typus, brachialis Stål, NHRS-GULI 000054297. Holotype of *P. egregia*, macropterous male, and slide-mounted paramere of a paratype (NMNH), Panama, 28.X.1934. Allotype of *P. egregia*, macropterous female (NMNH), Panama, Las Gracias, 25.II.1935. Holotype of *P. verdica*, macropterous female (NMNH), Brazil, São Paulo, 22.III.1934, (E.J. Hambleton). Paratype of *P. verdica*, macropterous male (NMNH), Brazil, Campinas, Goyaz, XII.1935, (B. Meier & S. Lopes) [the information about the paratype given by Drake (1951) differs from that written on the label].

Additional material examined. Slide-mounted paramere identified as *P. egregia* (NMNH), Brazil, Santa Catarina, [Seara], Nova Teutônia, 1.XI.1956, (F. Plaumann). 4 males, 1 female (MZUSP), all micropterous, Brazil, Roraima, Rio Uraricoera, Igarapé Tupaquiri, 24.X.1987, V. Py-Daniel & U. Barbosa col. 1 macropterous female (MZUSP), Brazil, Roraima, BR-401, Km 113, Igarapé Arraia, 29.X.1987, V. Py-Daniel & U. Barbosa col.

Platyvelia maritima (Polhemus and Manzano, 1992)

(Figs. 8G, 12, 13)

Paravelia maritima Polhemus and Manzano 1992: 315–317 (original description);

Platyvelia maritima; Polhemus and Polhemus 1993: 394 (changed combination).

Redescription. Apterous male paratype, BL 3.65 (without genital capsule); HW 0.75; ANT I 0.89, ANT II 0.57, ANT III 0.57, ANT IV 0.66; EYE 0.21; PL 0.94; PW 1.08; FORELEG: FEM 1.23, TIB 1.02, TAR I 0.08, TAR II 0.09, TAR III 0.28; MIDLEG: FEM 1.60, TIB 1.60, TAR I 0.08, TAR II 0.53, TAR III 0.38; HINDLEG: FEM 1.34, TIB 1.49, TAR I 0.08, TAR II 0.25, TAR III 0.38.

Head brown with shiny impressed longitudinal midline and two oblique indentations near base. Antennomeres I and III–IV light-brown; II yellow with the base and distal third brown. Eye dark reddish-brown. Labium with articles I and III yellowish-brown; II yellow; IV shiny dark-brown. Pronotum brown, darker on side of anterior lobe and center of posterior lobe. Pro- and mesopleura dark brown; metapleuron brown. Prosternum brown; meso- and metasterna dark-brown. Pro- and mesoacetabula dark-brown on lateral surface, yellowish-brown on mesal surface; metacetabulum brown. Coxae and trochanters yellow; apex of middle trochanter light-brown. Fore femur yellow, distal 2/3 dorsally light-brown; middle and hind femora yellow on proximal 2/3, with yellow band before middle and another closer to apex. Tibiae brown, each with yellow band close to base and another on middle. Fore tarsus light brown; middle and hind tarsi brown, tarsomere II with proximal half yellow. Abdominal mediotergites dark-brown; laterotergites brown, with silverish area on posterolateral angle of segment VI. Abdominal sterna and terminalia brown (Fig. 12).

Body covered by shiny short setae; longer brown setae present on clypeus, adjacent to mesal eye margin, anterolaterally on pronotum and on lateral margins of laterotergites. Antenna covered by short brown setae, with rows of longer thicker setae. Ocular setae absent. Buccula without circular punctures. Jugum and adjacent portion of proepisternum without black denticles. Labium reaching anterior margin of metasternum. Pronotum posteriorly shortened, broadly exposing angulate metanotal projection (Fig. 12A); with lateral and posterior margins almost continuously rounded, with incipient longitudinal median carina; continuous row of circular punctures adjacent to anterior margin of pronotum; pair of deeper punctures between anterior and posterior lobes; posterior lobe with several tiny scattered punctures. Pleural region of thorax with scattered circular punctures. Acetabula and abdominal sterna without black denticles. Mesosternum longitudinally impressed centrally. Proacetabulum with a deep puncture on posterior margin. Mesoacetabulum with a large, deep puncture on posteromesal surface, with posterior margin extending centrally to form a tubercle that touches another one projecting from anterolateral portion of metasternum. Legs covered by decumbent brown setae; femora and tibiae also with longer curved setae, especially on posterior surface; middle tibia with a row of very long thin setae starting right before middle. Femora each with patch of silverish setae on proximal half of posterior surface. Flexor surface of fore femur with several short spine-like black setae. Flexor surfaces of fore tibia, hind trochanter, femur, and tibia armed with short black spinules. Abdominal mediotergites transversely rectangular, except VII subquadrate with posterior margin centrally rounded. Abdominal sterna covered by long, thin, golden setae, without carina, projection or black denticles; sternum VII slightly elevated towards broadly rounded posterior margin. Abdominal segment VIII without black denticles. Proctiger without dorsal projections. Paramere slightly curved, lateral margins parallel or slightly converging, with rounded apex (Fig. 8G).

Discussion. *Platyvelia maritima* is known only from the apterous form, which differs from congeners by having the pronotum posteriorly shortened, broadly exposing a pair of angulate metanotal projections (Fig. 12A). In addition, the paramere of this species has lateral margins almost parallel to each other, with apex rounded (Fig. 8G). This species is known only from Valle del Cauca, Pacific region of Colombia (Fig. 13).

Type material examined. Paratype, apterous male (NMNH), Colombia, Valle del Cauca, Buenaventura, Punta Arenas, Mangrove swamps, 23.II.1986, M. R. Manzano.

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Conflicts of interest

The authors declare no conflicts of interest.

Author contribution statement

HDDR, CFBF and FFFM wrote the first draft of the manuscript. HDDR and FFFM defined the manuscript structure. CFBF carried out most of the photographs and preparation of maps. HZ provided part of photographs and redescription of a species. All the authors revised and approved the final version of this paper.

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