

Three new species of the water strider genus *Tachygerris* DRAKE, 1957 (Insecta: Heteroptera: Gerridae) from South America

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Abstract

During preparation of a forthcoming taxonomic revision of the Neotropical water strider genus *Tachygerris* DRAKE, 1957, three new species from South America were discovered which are described here: *Tachygerris pulcherrimus* sp.n. from Brazil, and *T. hecherae* sp.n. and *T. tuberculatus* sp.n. both from Ecuador. *Tachygerris pulcherrimus* sp.n. seems to be phylogenetically isolated, but shows some similarities to *T. quadrilineatus* (CHAMPION, 1898) and *T. adamsoni* (DRAKE, 1940). *Tachygerris hecherae* sp.n. is closely related to *T. spinulatus* (KUITERT, 1942), and *T. tuberculatus* sp.n. to *T. celocis* (DRAKE & HARRIS, 1930).

Key words: Gerridae, Gerromorpha, *Tachygerris*, new species, taxonomy, Neotropical, Brazil, Ecuador.

Zusammenfassung

Während der Vorbereitungsarbeiten zu einer taxonomischen Revision der Arten der Gattung *Tachygerris* DRAKE, 1957, wurden drei neue Arten entdeckt, die hier beschrieben werden. Es handelt sich um *Tachygerris pulcherrimus* sp.n. aus Brasilien sowie um *T. hecherae* sp.n. und *T. tuberculatus* sp.n., beide aus Ecuador. Bei *T. pulcherrimus* sp.n. dürfte es sich um eine phylogenetisch sehr isolierte Art handeln, obgleich einige Ähnlichkeiten mit den Arten *T. quadrilineatus* (CHAMPION, 1898) und *T. adamsoni* (DRAKE, 1940) bestehen. *Tachygerris hecherae* sp.n. ist mit *T. spinulatus* (KUITERT, 1942) nahe verwandt, und *T. tuberculatus* sp.n. mit *T. celocis* (DRAKE & HARRIS, 1930).

Introduction

The Neotropical water strider genus *Tachygerris* DRAKE, 1957, with type species *T. adamsoni* (DRAKE, 1940), belongs to the subfamily Gerrinae and contains seven species plus the three described herein. The distributional range of the genus is from Mexico southwards to Bolivia, Paraguay and Brazil. Only two species, *Tachygerris quadrilineatus* (CHAMPION, 1898) and *T. opacus* (CHAMPION, 1898), are known from Mesoamerica; they were the first two species described – originally in *Limnometra* MAYR, 1865 (CHAMPION 1898). Indeed, *Tachygerris* and the Australasian genus *Limnometra* have some strong similarities which, however, are regarded as convergences (ANDERSEN 1995). This is probably caused by life in similar habitats, lentic parts of streams and rivers or temporary pools in the forest (authors' observations, and Nico Nieser, in litt.). Furthermore, *Tachygerris* species were described from South America by DRAKE & HARRIS (1930), DRAKE (1940) and KUITERT (1942) in *Tenagogonus* STÅL, 1853, which at

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that time was regarded as a senior synonym of *Limnometra*. Later, DRAKE (1957a) proposed the new genus *Tachygonus* for the Neotropical species of *Tenagogonus*, but soon he (DRAKE 1957b) became aware that the name was preoccupied by *Tachygonus* SCHÖNHERR, 1833 (in Coleoptera), thus proposing the replacement name *Tachygerris*. HUNGERFORD & MATSUDA (1958) described *Tachygerris* in detail and added *T. surinamensis* from Suriname. MATSUDA (1960) included *Tachygerris* in his comprehensive study on Gerridae. The most recently described species is *Tachygerris dentiferus* PADILLA & NIESER, 2003 from Colombia (PADILLA & NIESER 2003). Recently, MORALES-CASTAÑO & MOLANO-RENDÓN (2009) revised the species of *Tachygerris*, but with the exception of two species, *T. spinulatus* (KUITERT, 1942) and *T. surinamensis* HUNGERFORD & MATSUDA, 1958.

After submission of this manuscript, PADILLA-GIL (2010) described another new species of *Tachygerris* from Colombia. From the key, illustrations and description, it is clear that *T. tumaquensis* PADILLA-GIL, 2010 is not a synonym of any of our new species.

Material and methods

For specimens of new species see the specific sections in the paragraphs "type material." Types are referred to by citing the original locality labels which are marked with " "; the backslash sign \ indicates the break of a line. The following collection acronyms are used:

FMBC Coll. Filippo M. Buzzetti, Arzignano, Vicenza, Italy

NHMW Natural History Museum, Vienna, Austria

SEMC Snow Entomological Collection, Kansas University, Lawrence, Kansas, U.S.A.

Holotypes, or at least paratypes, of all previously described species (except *T. tumaquensis*) were used for comparison.

Examination of specimens was chiefly done with a Leica M10 binocular microscope (maximum magnification 128 ×). Drawings (Figs. 8–19, 23–28) were done with the help of a camera lucida attached to this microscope. In Figs. 8–10 the forefemora are orientated in such way that their curvature is seen from behind and maximally bent; in this position the tibia points more or less in the direction of the viewer (note the ventro-apical emargination of the femur's surface). Vesica sclerites were cleared with lactic acid and drawings (Figs. 20–22) were primarily prepared with the help of a camera lucida attached to a Nikon MSZ1500 binocular microscope (maximum magnification 270 ×), but reconstructed from different views. The digital photographs (Figs. 1–7) were taken with a Leica DFC camera attached to a Leica MZ16 binocular microscope with the help of Image Manager IM50 and processed with Auto-Montage Pro and Adobe Photoshop 7.0 programmes.

Terminology follows ANDERSEN (1982) and, in part, CHEN & al. (2005).

Measurements are in millimetres and were taken in the following way: Body length in lateral view from apex of head to apex of wings (macropterous specimens) or to apex of proctiger (brachypterous specimens). Maximum body width (across meso-acetabula) in dorsal view. Head width across the eyes in dorsal view. Pronotum width at humeri of

pronotal lobe, in dorsal view. If not differently specified, measurements of antennomeres and legs are taken from the right limbs. Where ranges are given, all type specimens were measured. Other measurements refer to the holotype or the allotype.

Taxonomy

Notes on some taxonomically important characteristics

"Glabrous area" on head: This is a convenient characteristic to recognize a small group of species. In three species (*T. quadrilineatus*, *T. adamsoni*, and *T. pulcherrimus* sp.n.) a large shining area (distinct from the rest of the head surface) extends dorsally from the apex of the head backwards and reaches or surpasses the level of anterior eyes margin. The surface of the area lacks the normal pilosity (although scattered, extremely short hairs are present). In other species such an area is either totally absent or inconspicuous or restricted to a small area between antennal sockets. Clean, dry specimens are required to study this character.

Forefemur of male: During mating, male gerrids ride on the female. In many gerrine species with males smaller than or subequal to females, the male "embraces" the female's thorax with his forelegs. In such cases the males' forelegs are often modified (a sexual dimorphism), and a common modification is a curvature or bend of the femur. In *Tachygerris*, several grades and modes of curvature are observed – from almost straight to strongly bent; and in two species, *T. celocis* and *T. tuberculatus* sp.n., the forefemur bears a basal tubercle in addition.

Mesopleural stripes and mesopleural pilosity: The mesopleuron yields some very useful characters for species distinction: number, position, and distance of dark longitudinal stripes; dorsal extension (relative to stripes) of the venter's fine silverish pilosity; and presence or absence of silverish spots. There is a maximum of three dark mesopleural stripes (dorsal, medial and ventral). In some species, individual variation was observed, reducing the value of this character set.

Wings: In *Tachygerris* the large majority of specimens is macropterous. ANDERSEN (2000) and very recently also MORALES-CASTAÑO & MOLANO-RENDÓN (2009) even believed that all *Tachygerris* species are invariably long-winged. However, ARISTIZÁBAL GARCÍA (2002) reported two brachypterous males of *T. opacus* from Colombia, and the authors of the present paper studied brachypterous specimens of *T. quadrilineatus* (males and females), *T. celocis* (males only), and *T. tuberculatus* sp.n. (males only). Some female individuals of several species (e.g., *T. celocis*, *T. opacus*, *T. spinulatus*, *T. pulcherrimus* sp.n.) bear rows of very long setae along the distal half of the costal margin of the forewings. However, this is an intraspecific variation and not a diagnostic characteristic. It was never observed in males.

Pygophore: The pygophore is relatively uniform among species; in dorsal aspect it is ovate, usually elongate, but more or less widened in some species. Long species-specific setiferation is present in several species. Its dorsolateral margin may have a tooth near the insertion of the paramere, which is diagnostic for some species.

Proctiger: The proctiger of males often possesses highly diagnostic features regarding shape and pilosity. The proctiger of females is much smaller and less modified than that of males, but within the same species it follows the latter in its general shape (comp. Figs. 11–16).

Vesica sclerites: The vesica sclerites have undergone strong modifications among *Tachygerris* species – much more than in any other genus of Gerrinae – and display a large diversification from very complicated, asymmetrical assemblages of sclerites (e.g., *T. quadrilineatus* and *T. adamsoni*) to strong reductions (e.g., *T. opacus*). A spinous area on an accessory sclerite is present in several species. Despite their small size and difficulties in examination, such sclerites are very useful for species distinction.

Sternite 7 of female: This sclerite provides the best species-diagnostic features for distinguishing females. However, the outline of the posteroventral margin is or appears often quite variable. It should be pointed out that sternite 7 is often more or less bent along its midline, and therefore the shape of the medial lobe can appear either more rounded or more pointed in ventral aspect.

Description of species

Tachygerris hecherae sp.n. (Figs. 1, 5, 8, 11, 14, 17, 20, 23, 26, 29)

Etymology: Dedicated to Mag. Christine Hecher (Kirchberg am Wechsel, Austria) who collected most of the type material.

Type material: Holotype (macropterous male) and allotype (macropterous female) labeled "ECUADOR: Morona Santiago\ NE Macas, 28.7.1998\ 78°04'W 02°20'S, 900m\ leg. Ch. Hecher (3b)" (NHMW). Paratypes (all macropterous): four males (one missing head) and two females, same label as holo- and allotype (NHMW, 1 female FMBC); one male "ECUADOR-Napo\ Ahuano, Rio Rodriguez\ 2/6.XII.06 477m\ S1°4'54.5" W77°31'20.9" Lg F. M. Buzzetti" (FMBC); three females "Ecuador S.A.\ Febr.-11 23\ F.X. Williams" (SEMC); two males, with same label plus blue label "PARATYPE\ Tenagogenus\ spinulatus\ L Kuitert" (SEMC).

Type locality: Ecuador, Morona Santiago Province, northeast of Macas, 78°04' W 02°20' S, 900 m a.s.l.

Diagnosis: Size large, body length 8.3–9.6 mm in males, 9.7–10.2 mm in females. Only macropterous morph known. Pronotal lobe not or hardly infuscated and with golden or silverish pilosity along hind margin. Mesopleuron (Fig. 5) with single narrow brown stripe at dorsal margin. Silverish dot on meso-acetabulum triangular. Head with glabrous area restricted to apex in front of antennal sockets. – Male: Forefemur (Fig. 8) weakly curved at its basal half. Pygophore (Fig. 17) with tooth at dorsolateral margin. Proctiger (Fig. 11) lanceolate. In vesica (Fig. 20), ventral sclerite not fused with dorsal sclerite; no accessory sclerite. – Female: Sternite 7 (Figs. 23, 26) with short connexival spines, hind margin truncate.

Description of macropterous male: Measurements (in mm): Body length 8.3–9.6 (average: 9.1; holotype: 9.0); body width 2.09–2.27 (average: 2.16; holotype: 2.16); head width 1.50–1.63 (average: 1.56; holotype: 1.54). Additional measurements of holotype: head length 0.96; lengths of antennomeres: I 1.60, II 1.16, III 2.17, IV 3.08;



Figs. 1–4: Habitus of males, dorsal aspect, legs and antennae omitted, different scales. (1) *Tachygerris hecherae* sp.n. (head width 1.55 mm); (2) *T. pulcherrimus* sp.n. (head width 1.23 mm); (3) *T. tuberculatus* sp.n., macropterous specimen (head width 1.29 mm); (4) *T. tuberculatus* sp.n., brachypterous specimen (head width 1.34 mm).

pronotum width at humeri 1.69, pronotum length (inclusive of lobe) 3.49; lengths of leg segments: forefemur 2.89, foretibia 2.47, foretarsus 0.41+0.50, middle femur 7.50, middle tibia 5.49, middle tarsus 3.17+0.49, hind femur 7.35, hind tibia 3.43, hind tarsus 0.95+0.46.

Colour and pilosity (Figs. 1, 5): Dorsum of head light brown, in some specimens somewhat brownish infuscated along eyes. Pronotum pale brown, with whitish median stripe usually lined with darker brown; pronotal lobe pale brown with infuscated hind margin and humeri, in few specimens with slightly infuscated medial mark. Forewings brown. Tergites and laterotergites below wings blackish and dark brown, respectively. Sides and venter of body mainly pale yellow to whitish. Head with dark longitudinal stripe between eye and antennal socket. Propleuron with one broad brown stripe. Mesopleuron with dark brown, longitudinal dorsal stripe ventrally delimited by a longer whitish stripe; medial stripe usually visible, ventral stripe in few specimens recognizable. Pro-,

meso-, and meta-acetabula distally with dark brown mark. Legs and antennae brown, but antennomere 4, hind tibiae and all tarsi infuscated. Pronotal lobe along hind margin and base of forewings with more or less developed, short, golden and silverish pilosity. Dorsal edge of whitish pilosity on mesopleuron usually indistinct, in some specimens at ventral stripe. Silverish dots on meso- and meta-acetabulum strongly shining, that of meso-acetabulum triangular.

Structural characteristics: Head with small glabrous area in front of antennal sockets. Rostrum slightly surpassing mid-length of mesosternum. Hind margin of pronotal lobe almost angulate in middle. Forefemur (Fig. 8) almost evenly thick, gently curved in basal half. Middle femur with long apical spine. Mesosternum deeply impressed medially. Metasternum with median ridge anteriorly low or reduced. Sternite 7 medianly impressed, with posterior margin widely emarginated. Abdominal segment 8 with straight posteroventral margin.

Genital segments: Pygophore (Fig. 17) boat-shaped, with some scattered long setae posterolaterally; dorsolateral margin with distinct tooth near insertion of paramere. Proctiger (Fig. 11) long, lanceolate, with sides along distal two-thirds bearing some erect setae and slightly curved ventrad. Vesicula (Fig. 20) almost symmetrical (except arms of ventral sclerite): dorsal and ventral sclerite forming an evenly ovate bow; basal sclerite H-shaped in dorsal aspect; dorsal sclerite extremely slender, its extreme apex slightly widened and truncated; ventral sclerite not fused with dorsal sclerite, distally split into two long, diverging arms; lateral sclerite long and very slender; accessory sclerite absent.

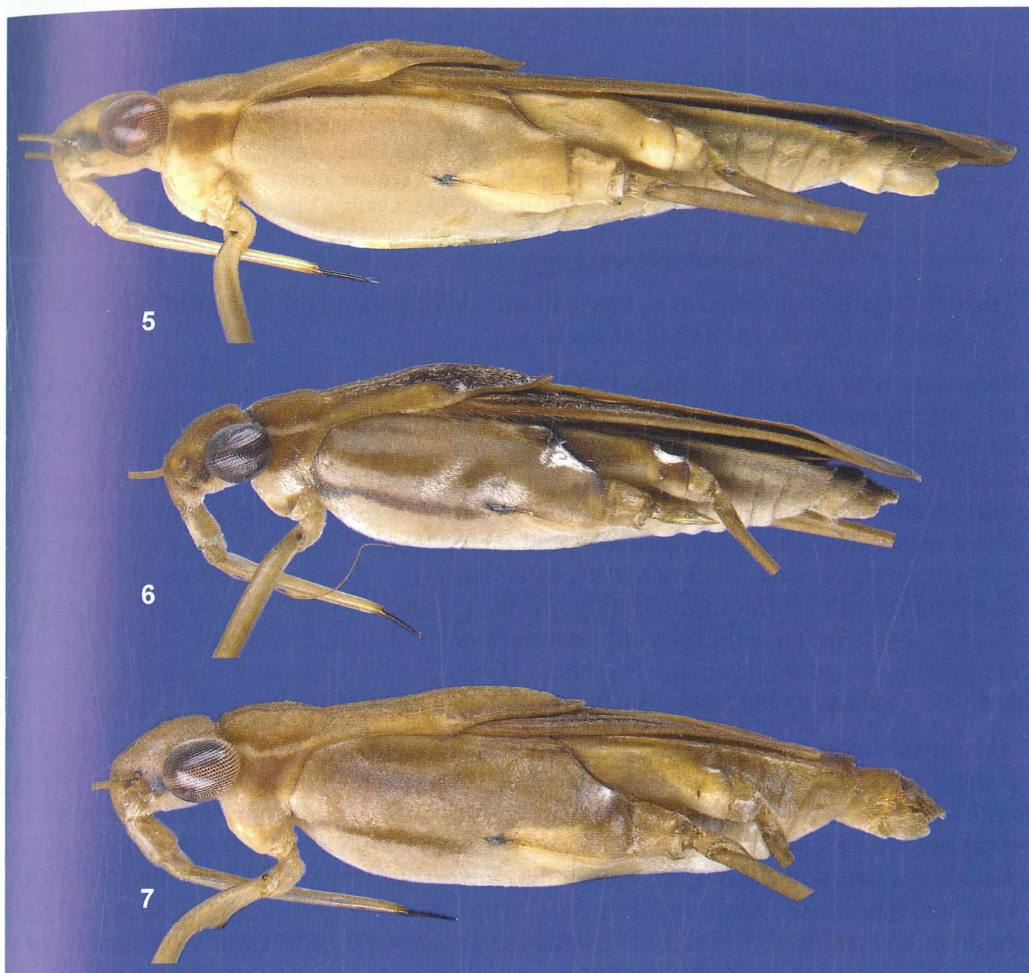
Description of macropterous female: Measurements (in mm): Body length 9.7–10.2 (average: 9.9; allotype: 9.7); body width 2.50–2.76 (average: 2.57; allotype: 2.52); head width 1.58–1.68 (average: 1.62; allotype: 1.63). Additional measurements of allotype: head length 1.04; lengths of antennomeres: I 1.53, II 1.09, III 2.00, IV 2.92; pronotum width at humeri 1.88, pronotum length (inclusive lobe) 3.67, lengths of leg segments: forefemur 3.08, foretibia 2.59, foretarsus 0.48+0.53, middle femur 7.65, middle tibia 5.55, middle tarsus 3.75+0.54, hind femur 7.47, hind tibia 3.95, hind tarsus 0.98+0.48.

Colour and pilosity similar as in male.

Structural characteristics: Forefemur almost straight, hardly curved at base. Metasternum with median ridge posteriorly narrowed, anteriorly widened to a large, but low swelling. Sternite 7 (Figs. 23, 26) with very short connexival spines not surpassing proctiger or protruded, truncate ventromedial lobe. Proctiger (Fig. 14) slender heart-shaped, with narrowly rounded apex.

Distribution: Ecuador: restricted to the Amazonian basin in the country's east (Fig. 29).

Comparative notes: *Tachygerris hecherae* sp.n. is very similar to *T. spinulatus* and was already confused with that species by KUITERT (1942); we have studied two "*T. spinulatus*" paratypes which belong to *T. hecherae* sp.n. However, there is a striking difference in the males' vesicae, because *T. hecherae* sp.n. (Fig. 20) lacks the very conspicuous accessory sclerite of *T. spinulatus*; and the arms of the ventral sclerites are longer and more diverging in *T. hecherae* sp.n. than in *T. spinulatus*. In both sexes of *T. hecherae* sp.n., the pygophore (Figs. 11, 14) is more acute than in *T. spinulatus* and the meso-



Figs. 5–7: Habitus of males (same specimens as in Figs. 1, 2, 4), lateral aspect, legs and antennae partly omitted, different scales. (5) *Tachygerris hecherae* sp.n. (body length 9.0 mm); (6) *T. pulcherrimus* sp.n. (body length 6.0 mm); (7) *T. tuberculatus* sp.n., brachypterous specimen (body length 6.5 mm).

femoral apical spine is longer. The anterior part (in front of scent orifice) of the metasternal median ridge is strongly pronounced in *T. spinulatus*, especially in males, whereas in *T. hecherae* sp.n. it is less distinct (in males) or widened to a large, but low swelling (in females). The male of *T. hecherae* sp.n. (Fig. 8) has the forefemur basally less narrowed than the male of *T. spinulatus*. The female of *T. hecherae* sp.n. differs from *T. spinulatus* by a wide and short medial lobe of the sternite 7 (Figs. 23, 26), which results in a smaller median length of sternite 7 (slightly shorter than the combined lengths of sternites 5 and 6 in *T. hecherae* sp.n., slightly longer in *T. spinulatus*).

The male of *T. dentiferus*, which has – like *T. hecherae* and *T. spinulatus* – a distinct tooth on the pygophore's dorsolateral margin, can be easily distinguished by small size, rhomboidally shaped pygophore, and more strongly curved forefemur.

***Tachygerris pulcherrimus* sp.n.** (Figs. 2, 6, 9, 12, 15, 18, 21, 24, 27, 29)

Etymology: Latin superlative of pulcher; meaning "the most beautiful"

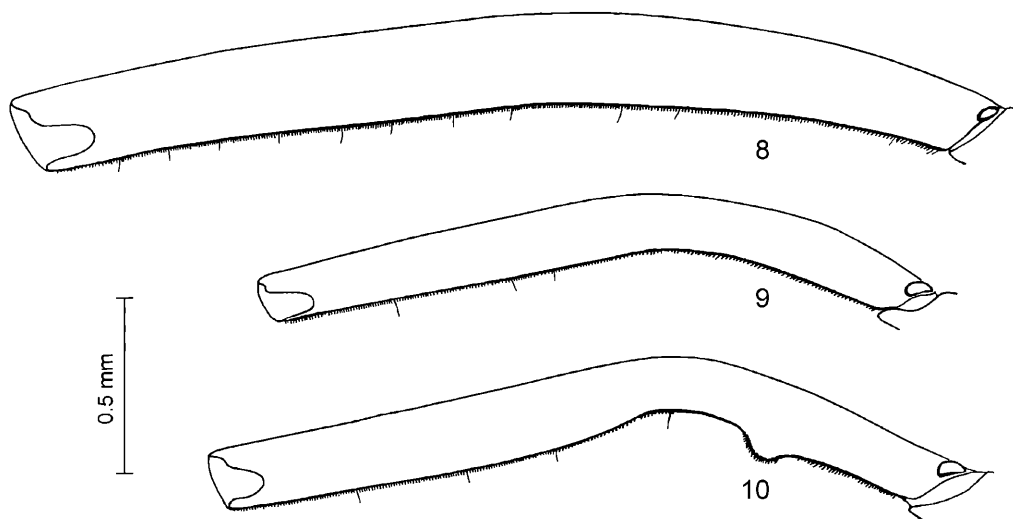
Type material: Holotype (macropterous male) and allotype (macropterous female) labeled "Brazil S. A. \ 7-10 9-20-36\ A.M. Olalla\ Vic. Joao Pessoa\ (Sao Phelipe)\ River Jurua\ No. 375" (SEMC). Paratypes (all macropterous): 1 male, same label data as holotype; 1 male, 5 females, same label data except No. 378; 3 males, 3 females, labeled "Brazil S. A. \ 9-25, 10-17-36\ A.M. Olalla\ Vic. Santo\ Antonio, River\ Eiru No. 3712"; 2 males same label data except No. 3714. Eleven paratypes in SEMC, two paratypes (one female and one male) in NHMW, two paratypes (one female and one male) in FMBC.

Type locality: Brazil, Amazonas State, in the vicinity of João Pessoa (06°40' S, 69°52' W), upper Rio Juruá, near mouth of rio Eiru.

Diagnosis: Size very small, body length 5.8–6.2 mm in male, 6.7–7.1 mm in female. Only macropterous morph known. Pronotal lobe variably, usually strongly, infuscated and with rich golden or silverish pilosity. Sternite 2 laterally with black (or dark brown) mark. Mesopleuron (Fig. 6) with three dark longitudinal stripes, medial one posteriorly interrupted; between medial and ventral stripe with three obvious dots of silverish pubescence. Silverish dot on meso-acetabulum triangular. Head with large glabrous area reaching or surpassing level of anterior eye margin. – Male: Forefemur (Fig. 9) distinctly curved at its basal third. Proctiger (Fig. 12) slender heart-shaped. In vesica (Fig. 21), dorsal sclerite apically split into two thick arms, unpaired accessory sclerite on left side bearing spicules. – Female: Sternite 7 (Figs. 24, 27) with short connexival spines, hind margin sinuate, with short, apically rounded medial lobe.

Description of macropterous male: Measurements (in mm): Body length 5.8–6.2 (average: 6.0; holotype: 6.0); body width 1.54–1.67 (average: 1.61; holotype: 1.62); head width 1.18–1.30 (average: 1.23; holotype: 1.21). Additional measurements of holotype: head length 0.72; lengths of antennomeres: I 1.15, II 0.89, III 1.60, IV 2.70; pronotum width at humeri 1.18; pronotum length (inclusive lobe) 2.34; lengths of leg segments: forefemur 1.94, foretibia 1.65, foretarsus 0.22+0.32, middle femur 4.60, middle tibia 3.52, middle tarsus 2.15+0.40, hind femur 4.58, hind tibia 1.60, hind tarsus 0.42+0.27.

Colour and pilosity (Figs. 2, 6): Dorsum of head light brown, infuscated along eyes. Pronotum anteriorly light or medium brown, with whitish median stripe usually lined with darker brown; pronotal lobe variably infuscated, in some specimens very dark, a lighter median stripe variably developed. Fore wings blackish brown. Tergites and laterotergites below wings blackish. Sides and venter of body mainly creamy white. Head between eye and antennal socket with brown longitudinal stripe. Propleuron with broad brown stripe. Mesopleuron with three dark longitudinal stripes, dorsal one distant from dorsal margin, medial one posteriorly interrupted, ventral one darkest. Pro-, meso-, and meta-acetabula distally with dark brown marks. Connexival margin with blackish mark at sternite 2(–3). Legs and antennae yellowish or light brownish, but antennomere 4, tibiae and tarsi infuscated. Pronotal lobe and base of forewings with more or less developed, short, golden and silverish pilosity which is longest and densest along margin of pronotal lobe behind humeri, in some specimens also in front of humeri. Ventral fine silverish hair layer of mesopleuron dorsally reaching medial longitudinal stripe; between medial and ventral stripe with three obvious dots of obvious silverish pubescence. Sil-



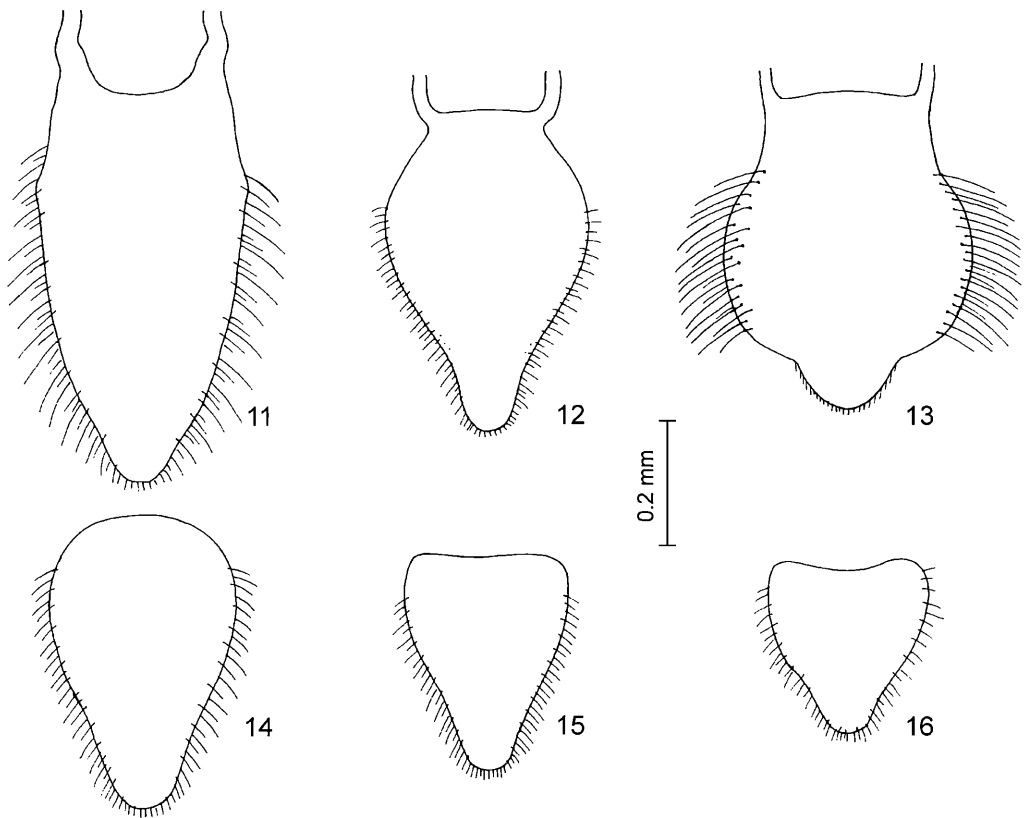
Figs. 8–10: Left forefemora of males; pilosity partly omitted; aspect as described in methods. (8) *Tachygerris hecherae* sp.n.; (9) *T. pulcherrimus* sp.n.; (10) *T. tuberculatus* sp.n.

verish dots on meso- and meta-acetabulum strongly shining, that of meso-acetabulum triangular.

Structural characteristics: Glabrous area of head large, posteriorly reaching or surpassing level of anterior eye margin. Rostrum surpassing mid-length of mesosternum. Hind margin of pronotal lobe rounded. Forefemur (Fig. 9) almost evenly thick, distinctly curved at ca. basal third, ventrally with distinct, but very short pubescence all over length. Middle femur with short apical spine. Mesosternum deeply impressed medianly. Metasternum with very weak median ridge, anteriorly low or reduced. Sternite 7 without impression, with posterior margin widely emarginated. Abdominal segment 8 with straight posteroventral margin.

Genital segments: Pygophore (Fig. 18) broad, boat-shaped, posteriorly low; dorsolateral margin simple, without tooth. Proctiger (Fig. 12) slender heart-shaped, apically pointed to narrowly rounded, with sides at maximum width bearing some erect, but rather short setae. Vesicula (Fig. 21): dorsal and ventral sclerite completely fused, forming an ovate bow; basal sclerite ovate in dorsal aspect; dorsal sclerite apically split into two short, thick arms; ventral sclerite straight, not split into arms; lateral sclerite short, narrow, and curved; unpaired accessory sclerite on left side bearing numerous small spicules.

Description of macropterous female: Measurements (in mm): Body length 6.7–7.1 (average: 6.9; allotype: 6.7); body width 2.05–2.26 (average: 2.15; allotype: 2.13); head width 1.25–1.38 (average: 1.33; allotype: 1.26). Additional measurements of allotype: head length 0.74; lengths of antennomeres: I 1.24 II 0.92, III 1.52, IV 2.62; pronotum width at humeri 1.45, pronotum length (inclusive lobe) 2.66, lengths of leg segments: forefemur 2.18, foretibia 1.84, foretarsus 0.33+0.38, middle femur 5.32, middle tibia 4.08, middle tarsus broken, hind femur 4.08, hind tibia 2.10, hind tarsus 0.61+0.34.



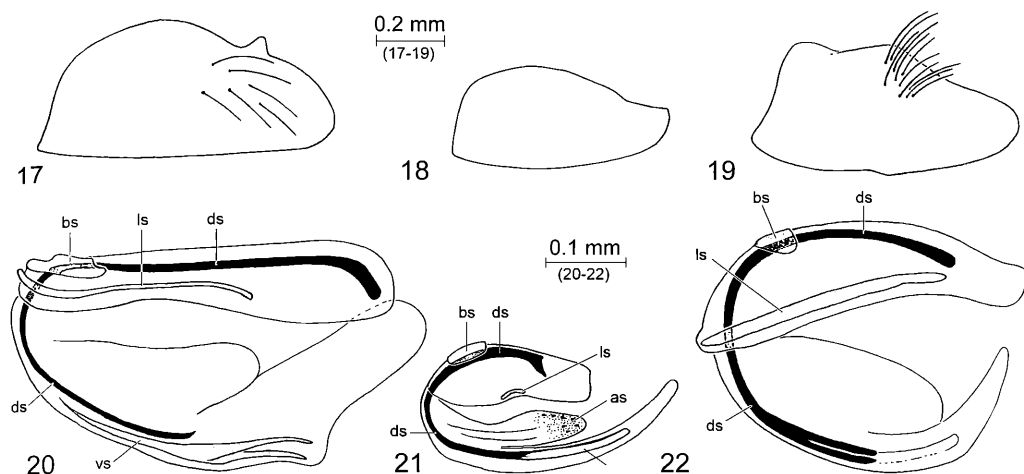
Figs. 11–16: Proctigers of males (11–13) and females (14–16), dorsal aspect; pilosity half-schematically and partly omitted. (11, 14) *Tachygerris hecherae* sp.n.; (12, 15) *T. pulcherrimus* sp.n.; (13, 16) *T. tuberculatus* sp.n.

Colour and pilosity similar to male. Forewings with or without long erect setae at middle part of costal margin.

Structural characteristics: Fore femur straight. Metasternum with median ridge only posteriorly developed, narrow. Allotype with short row of long setae at distal half of the forewing's costal margin. Sternites 4–6 with distinct, narrow median ridge. Sternite 7 (Figs. 24, 27) with short connexival spines not surpassing proctiger or apex of short, triangular, apically rounded medial lobe. Proctiger (Fig. 15) heart-shaped, slender, with pointed to narrowly rounded apex.

Distribution: Brazil: Amazonas State (Fig. 29).

Comparative notes: *Tachygerris pulcherrimus* sp.n. can be easily distinguished from all congeners by the pattern of colour and pilosity on its thorax sides (Fig. 6), specifically the posteriorly interrupted medial mesopleural stripe, three dots of silverish pubescence between medial and ventral stripe, and strongly shining, large silverish dots on meso- and meta-acetabula. The male has a slender forefemur which is sharply curved at its basal two-fifths, a slender, heart-shaped proctiger, and a vesica possessing a char-



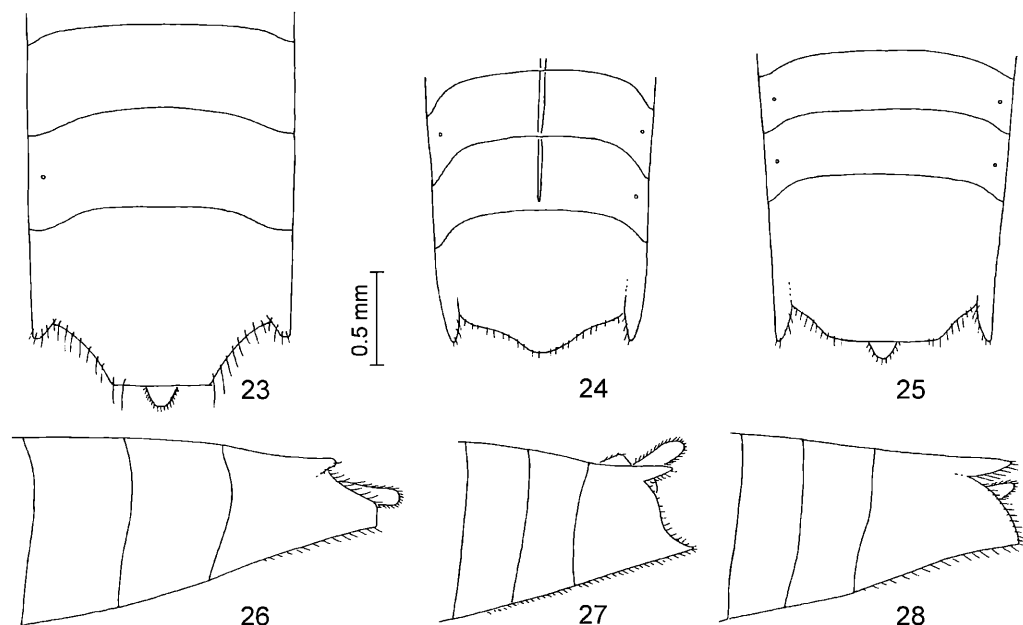
Figs. 17–22: (17–19) Pygophores of males, lateral aspect; pilosity half-schematically and partly omitted. (20–22) Vesica sclerites of males, lateral aspect. (17, 20) *Tachygerris hecherae* sp.n.; (18, 21) *T. pulcherrimus* sp.n.; (19, 22) *T. tuberculatus* sp.n. as – accessory sclerite, bs – basal sclerite, ds – dorsal sclerite, ls – lateral sclerite, vs – ventral sclerite.

acteristic accessory sclerite beset with spicules. The female has a distinct median ridge on sternites 4–6 and a characteristically shaped sternite 7 with short connexival spines and a short, apically rounded medial lobe on its ventral hind margin; however this margin has a quite variable appearance, because the sternite is variably compressed in the type series. The usually strongly infuscated pronotal lobe, the dark mark at dorsal margin of sternite 2, and the large glabrous area on the head resemble *T. quadrilineatus*, but the small body size, the heart-shaped proctiger of the male and the relatively simple vesica sclerites differ strongly from the closely related, probably parapatric species-pair, *T. quadrilineatus* – *T. adamsoni*.

***Tachygerris tuberculatus* sp.n.** (Figs. 3, 4, 7, 10, 13, 16, 19, 22, 25, 28)

Etymology: Latinized adjective, meaning tuberculate, referring to the tubercle on the male's forefemur.

Type material: Holotype (macropterous male) and allotype (macropterous female) labeled "ECUADOR: Napo Prov.\ Jatún Sacha, 1.8.1998\ 77°37'W 01°04'S, 400m\ leg. Ch. Hecher (17a)" (NHMW). Paratypes: 2 brachypterous males, 1 macropterous female, same label data as holotype (NHMW); 1 brachypterous male labeled "ECUADOR: Napo Prov.\ Jatún Sacha, 30.7.1998\ 77°37'W 01°04'S, 400m\ leg. Ch. Hecher (6)" (NHMW); 1 brachypterous male labeled "ECUADOR: Napo Prov.\ Jatún Sacha, 31.7.1998\ 77°37'W 01°04'S, 400m\ leg. Ch. Hecher (16)" (NHMW); 1 brachypterous male labeled "ECUADOR: Napo Prov.\ Jatún Sacha, 7.8.1998\ 77°37'W 01°04'S, 400m\ leg. Ch. Hecher (42)" (NHMW); 1 macropterous female labeled "Ecuador S. A.\ Feb.-11-23\ F.X. Williams" (SEMC); 1 macropterous female labeled "Ecuador S. A.\ Dec. 26, 1935\ Wm. MacIntyre\ Napo\ Watershed\ Note 3581" (SEMC); 1 macropterous male (head missing), 1 macropterous female labeled "Ecuador S. A.\ Nov. 1935\ Wm. MacIntyre" (SEMC); 1 macropterous female labeled "ECUADOR-Napo\ Ahuano, Rio Rodriguez\ 2/6.XII.06 477m\ S1°4'54.5"W77°31'20.9"\ Lg F. M. Buzzetti" (FMBC); 1 macropterous male, 1 macropterous female labeled "ECUADOR-Napo\ Ahuano, 1/6. XII. 06\ 450m lg F.M.Buzzetti" (FMBC).



Figs. 23–28: Sternites 6 and 7 of females, ventral (23–25) and lateral (26–28) aspects. (23, 26) *Tachygerris hecherae* sp.n.; (24, 27) *T. pulcherrimus* sp.n.; (25, 28) *T. tuberculatus* sp.n.; pilosity partly omitted.

Type locality: Ecuador, Napo Province, Jatún Sacha, 77°37' W 01°04' S, 400 m a.s.l.

Diagnosis: Size small, body length 6.8–7.0 mm in macropterous male, 6.3–6.6 mm in brachypterous male, 7.9–8.4 mm in macropterous female. Antenna of male distally leucine. Pronotal lobe pale brown. Mesopleuron (Fig. 7) with three brown longitudinal stripes, dorsal and medial stripe narrowly separated from each other, ventral one widely separated from medial one and narrowest. Head with very small glabrous area. – Male: Forefemur (Fig. 10) slender, with prominent tubercle at proximal fourth and strong bend at proximal third of femur length. Posterior margin of sternite 7 widely and deeply emarginated. Posteroventral margin of abdominal segment 8 with short lobe. Pygophore posteriorly widened, posterolaterally with some long setae, dorsolateral margin without tooth. Proctiger (Fig. 13) wide, with strongly convex sides and pointed apex, laterally with long setae. Vesica (Fig. 22): sclerites symmetrical; dorsal sclerite forming a short bow, lateral sclerites long and slender. – Female: Sternite 7 (Figs. 25, 28) with well developed but short connexival spines, hind margin of posteromedial lobe broadly rounded.

Description of macropterous and brachypterous male: Measurements (in mm): Body length: macropterous male 6.8–7.0 (average: 6.9; holotype 6.8), brachypterous male 6.3–6.6 (average: 6.5); body width: macropterous male 1.74–1.83 (average 1.79; holotype 1.79), brachypterous male 1.73–1.88 (average: 1.81); head width: macropterous male 1.29 (holotype 1.29), brachypterous male 1.26–1.36 (average: 1.31). Additional measurements of holotype: head length 0.86; lengths of antennomeres: I 1.24, II

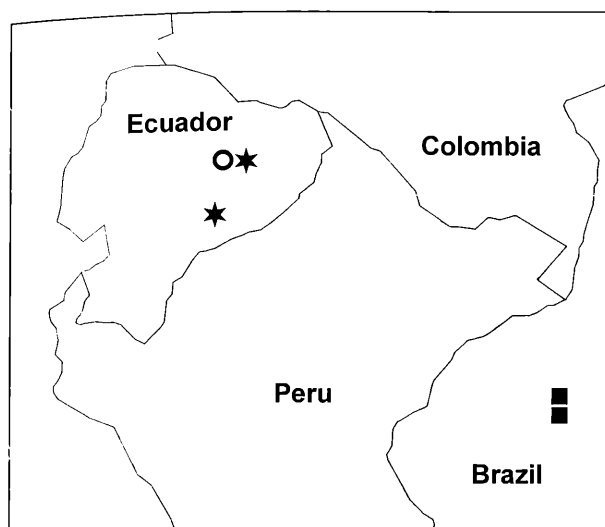


Fig. 29: Distribution map of *Tachygerris hecherae* sp.n. (asterisks), *T. pulcherrimus* sp.n. (squares) and *T. tuberculatus* sp.n. (circle).

0.97, III 1.97, IV 2.60; pronotum width at humeri 1.35, pronotum length (inclusive lobe) 2.65; lengths of leg segments: forefemur 2.05, foretibia 1.83, foretarsus 0.32+0.37, middle femur 5.56, middle tibia 3.95, middle tarsus 2.14+0.40, hind femur 5.05, hind tibia 1.99, hind tarsus 0.50+0.31.

Colour and pilosity (Figs. 3, 4, 7): Dorsum of head light brown, somewhat darker along eyes in some macropterous specimens. Pronotum light brown, with anterior whitish median stripe usually lined with darker brown; pronotal lobe infuscated on humeri and along hind border, but less so in brachypterous specimens. Fore wings blackish brown in macropterous morph, light brown with more or less infuscated base in brachypterous morph. Tergites below wings more or less infuscated. Sides and venter of body mainly creamy white. Head between eyes and antennal sockets with distinct brown longitudinal stripe. Propleuron with broad brown stripe. Mesopleuron with three dark longitudinal stripes, dorsal one slightly distant from dorsal margin, ventral one darkest and narrowest. Pro-, meso-, and meta-acetabula distally with small brown mark. Connexival margin concolourous with venter. Legs and antennae brown; antennomere 4 distally with long, yellow to leucine section and strongly infuscated short apex; tarsi and sometimes tibiae infuscated. Golden and silverish pilosity along margin of pronotal lobe behind humeri and on basal half of wings. Silverish dots on meso- and meta-acetabulum strongly shining, that of meso-acetabulum squared.

Structural characteristics: Glabrous area of head restricted to small area between antennal sockets. Rostrum surpassing mid-length to mesosternum. Hind margin of pronotal lobe almost angulate in middle. Forefemur (Fig. 10) almost constricted at level of distinct bend at basal third of femur length, ventrally with very short pubescence all over length, at basal fourth of length with ventral tubercle covered by dark and dense pubescence. Middle femur with long apical spine. Mesosternum deeply impressed medianly. Metasternum with very weak median ridge, anteriorly low or reduced. Sternite 7 impressed in middle, with posterior margin widely emarginated. Abdominal segment 8 with short posteroventral lobe.

Genital segments: Pygophore (Fig. 19) broadly boat-shaped, posteriorly slightly widened and low, laterally with some very long curved setae; dorsolateral margin without tooth. Proctiger (Fig. 13) round, apically pointed, with sides at maximum width bearing some erect, long, slightly ventrally curved setae. Vesica (Fig. 22): sclerites symmetrical; dorsal sclerite forming a short bow, ventroapically split into two subparallel arms, dorsoapically with simple apex; ventral "sclerite" hardly visible; lateral sclerites very long and slender, almost straight; basal sclerite roundish, subtriangular in dorsal aspect; no accessory sclerite.

Description of macropterous female: Measurements (in mm): Body length: 7.9–8.4 (average: 8.2; allotype: 8.0); body width: 2.19–2.42 (average: 2.28; allotype: 2.30); head width: 1.36–1.48 (average: 1.41; allotype: 1.42). Additional measurements of allotype: head length 0.88; lengths of antennomeres: I 1.36, II 1.00, III 2.02, IV 2.83; pronotum width at humeri 1.59; pronotum length (inclusive lobe) 3.20; lengths of leg segments: forefemur 2.64, foretibia 2.21, foretarsus 0.39+0.43, middle femur 6.28, middle tibia 4.85, middle tarsus 2.90+0.42, hind femur 5.95, hind tibia 2.68, hind tarsus 0.69+0.37.

Colour and pilosity similar to male, but apex of antenna not whitish.

Structural characteristics: Fore femur straight. Metasternum with weak median ridge only posteriorly developed, narrow. Sternite 7 (Figs. 25, 28) with short connexival spines not surpassing proctiger and apex of broadly rounded or slightly truncate hind margin of medial lobe. Proctiger (Fig. 16) extremely small, its apex – similarly as in male – slightly produced.

Distribution: Ecuador: restricted to the Amazonian basin in the country's east (Fig. 29).

Comparative notes: Like in *T. celocis*, the male of *T. tuberculatus* sp.n. has a distinct tubercle on the forefemur (Fig. 10), which easily distinguishes these two species from other congeners. The male of *T. tuberculatus* sp.n. differs from *T. celocis* in several characteristics, i.e., the whitish apical part of the antenna, the short ventral lobe of segment 8, the laterally slightly expanded pygophore (Fig. 19), the very broad proctiger (Fig. 13) terminating in a relatively short apex, and the very obvious long setae on both pygophore and proctiger. Females of these two species can be easily distinguished by the completely different medial lobe of sternite 7, which is small and squared in *T. celocis* but short and wide in *T. tuberculatus* sp.n. (Fig. 25). In addition, both sexes of *T. tuberculatus* sp.n. have longer apical mesofemoral spines and larger silverish mesoacetabula marks than specimens of *T. celocis*.

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