

## Research article

urn:lsid:zoobank.org:pub:3084F3F6-F249-4E76-8B79-87DDACDC7934

## A new genus and five new species of Neocoelidiinae leafhoppers from Brazil (Insecta: Hemiptera: Cicadellidae) with a key to males

Clayton C. GONÇALVES<sup>1</sup> & Alexandre C. DOMAHOVSKI<sup>2,\*</sup><sup>1</sup>Laboratório de Entomologia, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro. Caixa Postal 68044, 21941-971, Rio de Janeiro, RJ, Brazil.<sup>2</sup>Departamento de Zoologia, Universidade Federal do Paraná. Caixa Postal 19020, 81531-980, Curitiba, PR, Brazil.\*Corresponding author: [domahovskiac@yahoo.com.br](mailto:domahovskiac@yahoo.com.br)<sup>1</sup>Email: [clayton.correa.goncalves@gmail.com](mailto:clayton.correa.goncalves@gmail.com)<sup>1</sup>urn:lsid:zoobank.org:author:41E6BE64-C8CD-4BAF-86AA-272CF5BE88C5<sup>2</sup>urn:lsid:zoobank.org:author:0B988BD5-599B-42CE-ADCB-50FC813E104E

**Abstract.** A new Brazilian leafhopper genus of the subfamily Neocoelidiinae is proposed: *Takiyaella* gen. nov. based on *T. sexguttata* (Chiamolera & Cavichioli, 2003) gen. et comb. nov. and five new species: *T. anomala* gen. et sp. nov., *T. coelhomarquesae* gen. et sp. nov., and *T. daniela* gen. et sp. nov. from the state of Rio de Janeiro; *T. cavichiolii* gen. et sp. nov. from the state of Paraná, and *T. mejdalanii* gen. et sp. nov. from the state of Minas Gerais. A distribution map and identification key to *Takiyaella* species are provided.

**Keywords.** Auchenorrhyncha, leafhoppers, Neocoelidiini, Neotropical region, taxonomy.

Gonçalves C.C. & Domahovski A.C. 2021. A new genus and five new species of Neocoelidiinae leafhoppers from Brazil (Insecta: Hemiptera: Cicadellidae) with a key to males. *European Journal of Taxonomy* 775: 34–61. <https://doi.org/10.5852/ejt.2021.775.1545>

### Introduction

Neocoelidiinae Oman, 1943 includes leafhoppers restricted to the New World, most of which are endemic to the Neotropical region and only four genera occur in the Nearctic region (Nielson & Knight 2000). Currently, the subfamily is divided into two tribes: Neocoelidiini Oman, 1943 with 28 genera and 175 species and Krocodonini Marques-Costa & Cavichioli, 2012 with 14 species allocated in four living genera and one fossil (Dietrich 2003; Marques-Costa & Cavichioli 2012; Coelho-Marques & Ale-Rocha 2016, 2017; Gonçalves & Mejdalani 2017). In the phylogenomics of Membracoidea Rafinesque, 1815 (Dietrich *et al.* 2017), using 388 loci and more than 99,000 aligned nucleotide positions, Neocoelidiinae was recovered as a sister group of Portanini Linnavuori, 1959 (Aphrodinae), both as a sister group of Deltocephalinae Dallas, 1870.

Neocoelidiines are small to large leafhoppers, measuring 3–14 mm, commonly having coloration in shades of green, yellow or orange, and are distinguished from other subfamilies by the following combination of characters: (1) crown generally elevated and flat between the eyes; (2) ocelli in the transition between the crown and frons or close to it, rarely located on the crown or face; (3) frons with muscle impressions inconspicuous or slightly visible; (4) very long antenna, often exceeding the total body length; (5) pronotum with posterior margin usually emarginate V-shaped; (6) mesothorax frequently well developed, pleurae extending to the sternum, giving individuals a swollen aspect ventrally; (7) forewing with venation usually indistinct, except apically and (8) with transverse vein  $r-m_1$  absent; (9) hind wing with  $R_{4+5}$  and  $M_{1+2}$  veins usually confluent preapically, fused at the apex, forming a single vein; and (10) valve of the male terminalia generally entirely fused to the subgenital plates (Kramer 1964; Dietrich 2003; Marques-Costa & Cavichioli 2012).

There are few records regarding the biology and habits of the neocoelidiines. It is known that most species can be found in fields and forested areas, over trees and shrubs. Members of this subfamily were collected on plants of the following genera: *Arctostaphylos* Adans., *Coffea* L., *Heterotheca* Cass., *Hordeum* L., *Ipomoea* L., *Medicago* L., *Musa* L., *Paspalum* L., *Persea* Mill., *Pinus* L., *Pluchea* Cass., *Prunus* L., *Pyrus* L., *Quercus* L., *Rhus* L., *Sapindus* L., *Senegalia* Raf., *Sphaeralcea* A.St.-Hil, and *Vigna* Savi (Bruner & Metcalf 1934; Knull 1942; DeLong 1953; Kramer 1967; Maes & Godoy 1993; Chiamolera & Cavichioli 2005).

This paper aims to describe a new genus of Neocoelidiini from Brazil: *Takiyaella* gen. nov. based on *T. sexgutatta* (Chiamolera & Cavichioli, 2003) gen. et comb. nov. and five new species: *T. anomala* gen. et sp. nov., *T. coelhomarquesae* gen. et sp. nov. and *T. daniela* gen. et sp. nov. from the state of Rio de Janeiro, *T. cavichiolii* gen. et sp. nov. from the state of Paraná and *T. mejdalani* gen. et sp. nov. from the state of Minas Gerais. A distribution map and key to males of *Takiyaella* gen. nov. are provided.

## Material and methods

### Institutional abbreviations

- DZRJ = Coleção Entomológica Prof. José Alfredo Pinheiro Dutra, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil.  
 DZUP = Coleção Entomológica Pe. Jesus Santiago Moure, Universidade Federal do Paraná, Curitiba, Brazil.  
 MNRJ = Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil.

Terminology follows mainly Young (1968, 1977), except for head features (Hamilton 1981; Mejdalani 1993, 1998), wings (Dietrich 2005), leg chaetotaxy (Rakitov 1997) and sculpturing pattern of first valvulae of ovipositor (Hill 1970). Techniques used for dissection of the male terminalia follow Oman (1949), with a few modifications described by Cavichioli & Takiya (2012). Female terminalia were prepared according to the techniques of Zanol (1988) and Mejdalani (1998). Square brackets ([ ]) in material label data were used to supplement abbreviated information. The distribution map was compiled in QGIS® ver. 3.16 (2021; <http://www.qgis.org/>).

## Results

### Taxonomy

Class Insecta Linnaeus, 1758  
Order Hemiptera Linnaeus, 1758  
Suborder Auchenorrhyncha Duméril, 1806  
Family Cicadellidae Latreille, 1825  
Subfamily Neocoelidiinae Oman, 1943  
Tribe Neocoelidiini Oman, 1943

Genus *Takiyaella* gen. nov.  
urn:lsid:zoobank.org:act:6E1BFF39-D305-4E7C-982E-D315E686A299  
Figs 1–13

### Type-species

*Takiyaella daniela* gen. et sp. nov.

### Diagnosis

Medium-sized leafhoppers (Fig. 12). Head (Figs 1A, 7A, 8A) slightly produced anteriorly, with crown-face transition rounded, without carina; lateral margins of crown, adjacent to eyes, elevated and not carinated. Antennal ledge (Fig. 1B) narrow, slightly prominent and weakly carinated. Forewing (Figs 1D, 7D) with two or three dark maculae on claval commissure; crossvein 's' missing. Male pygofer (Figs 3E, 8E) approximately rectangular, ventral margin with sclerotized subapical serrated tooth; caudal margin usually with ventral rounded lobe. Subgenital plates (Figs 1G, 8G) fused to each other along the basal two-thirds; ventral surface with few apical macrosetae. Connective (Figs 1H, 3H) Y- or V-shaped. Aedeagus (Figs 1J, 7J, 8J) with one or two pairs of atrial processes, gonopore apical. Second valvula of ovipositor (Figs 4G, 9G) fused to each other just near base, dorsal margin with several irregular small teeth.

### Etymology

The generic name *Takiyaella* (feminine noun) is a tribute to Prof. Dr Daniela Maeda Takiya in recognition of her remarkable contribution to our knowledge of the Brazilian Auchenorrhyncha.

### Description

HEAD AND THORAX. Head, in dorsal view (Figs 1A, 7A), slightly produced anteriorly, median length of crown approximately equal or slightly less than interocular width; transocular width about  $\frac{4}{5}$  humeral width of pronotum; crown subrectangular, anterior margin rounded, surface flat, texture shagreen; ocellus medium-sized, on anterior margin of head, distant from eye margin, visible in dorsal view; coronal maculae distinct at basal half, between midline and eyes; coronal suture distinct in basal third, evanescent anteriorly. Head, in frontal view (Figs 1B, 10B), with face slightly higher than wide; frontogenal suture extending to antennal ledge but not reaching ocellus; antennal ledge narrow, slightly prominent, oblique and weakly carinated; frons approximately  $1.8 \times$  as long as wide; muscle impressions indistinct; epistomal suture distinct but incomplete, evanescent medially; clypeus  $1.5 \times$  as long as maximum width, lateral margins parallel, apex slightly emarginated; maxillary plate produced ventrally, reaching clypeus apex; lorum ellipse-shaped, apical margin not reaching apex of clypeus; gena incompletely covering episternum. Head, in lateral view (Figs 1C, 3C), with crown-face transition rounded, without carina; lateral margins of crown, adjacent to eyes, elevated and not carinated; antennal pits at same level as an imaginary line tangent to anteroventral angles of eyes; antenna with long flagellum, exceeding half-length of forewing; frons convex. Pronotum (Figs 1A, 5A) with inconspicuous transverse striae

on disc; lateral margins rounded, convergent anterad, and slightly shorter than eye length; posterior margin roundly excavated; in lateral view (Figs 1C, 8C), slightly declivous; dorsopleural carina present and complete. Mesonotum (Fig. 8A) as long as wide. Forewing (Figs 1D, 7D) mostly semi-hyaline, except for apical cells and apex of anteapical cells hyaline,  $3.5 \times$  as long as maximum width; venation indistinct, except apically; two anteapical cells, crossvein sectorial 's' missing; four apical cells: first to third approximately rectangular, third enlarged apically, fourth rhomboid, base of second more proximal than base of third; appendix narrow; apex rounded. Hind wing with vein  $R_{4+5}$  and  $M_{1+2}$  preapically convergent, fused to each other at apex, forming single vein. Profemur with AD, AM, and PD rows reduced and poorly defined, with exception of apical setae  $AD_1$ ,  $AM_1$ , and  $PD_1$ , respectively; AV and PV rows absent; IC row formed by slightly arched comb of fine setae, beginning at distal half of femur and extending to apex. Protibia, in cross-section, semi-circular; AV row formed by approximately 20 setae, slightly longer and thicker towards apex; AD and PD rows without differentiated setae; PV row with 2–3 widely spaced setae. Metafemur with setal formula 2:2:1, with inner setae of second pair reduced in size. Metatibial AD row with 2–4 intercalary setae between macrosetae; PD, AD, and PV rows with 13–15, 10–12, and 28–32 macrosetae, respectively; AV row with approximately 11 macrosetae distributed along most of tibia, except in the proximal and distal portions. Metatarsomere I longer than combined length of two distal tarsomeres; plantar surface with two rows of setae, external row with longer and robust setae than inner row; pecten with five platellae. Metatarsomere II pecten with three platellae.

**MALE TERMINALIA.** Pygofer (Figs 1E, 3E, 5E) approximately rectangular, usually apically expanded with an apical ventral lobe; macrosetae absent; ventral margin little sclerotized medially, with a sclerotized and serrated tooth on apical portion. Valve (Figs 1G, 8G) without indication of separation with subgenital plates. Subgenital plate (Figs 3G, 5G) not exceeding pygofer apex; plates fused to each other along the basal two-thirds; ventral surface with few apical macrosetae; in lateral view (Figs 1F, 7F), deeply concave. Connective (Figs 1H, 7H) Y- or V-shaped, articulated to aedeagus base, not bifurcated at the point of articulation. Style (Figs 1I, 8I) with apodeme expanded; ventral margin with median lobe; preapical setae present; preapical lobe moderately developed, slightly produced posterad; apex curved ventrally, hook-shaped. Aedeagus (Figs 1J–K, 5J–K) with preatrium long and robust; atrium with one or two pairs of processes; shaft curved dorsoanteriorly, usually expanded at apex; gonopore apical. Anal tube (Figs 3M, 5L, 8E) cylindrical, usually with small basiventral process with denticles.

**FEMALE TERMINALIA.** Sternite VII (Figs 2C, 4C, 6C, 9C, 11A) subquadrangular; posterior margin widely rounded. 'Internal' sternite VIII membranous. Pygofer (Figs 2D, 4D, 6D, 9D, 11B) elongate,  $1.7 \times$  as long as maximum height; macrosetae distributed near apex and ventral margin. First valvifer (Figs 2E, 4E, 6E, 9E, 11C) higher than long, dorsal margin straight, posterior margin slightly oblique. First valvula of ovipositor (Figs 2E, 4E, 6E, 9E, 11C) elongated, moderately curved dorsally; dorsal sculptured area submarginal, present throughout apical half; apex (Figs 2F, 4F, 6F, 9F, 11D) acute. Second valvifer (Figs 2I, 4I, 6I, 9I, 11G) higher than long. Second valvula of ovipositor (Figs 2G, 4G, 6G, 9G, 11E) elongated, moderately curved dorsally in the apical half, fused to each other just near base; apical portion (Figs 2H, 4H, 6H, 9H, 11F) slightly expanded, dorsal margin with several irregular small teeth. Gonoplac (Figs 2I, 4I, 6I, 9I, 11G) expanded on apical half; external surface along ventral margin and apex with dentiform cuticular projections and few short and robust setae; apex (Figs 2J, 4J, 6J, 9J, 11H) rounded or acutely rounded.

### Distribution

Brazil (states of Minas Gerais, Paraná and Rio de Janeiro). Species of *Takiyaella* gen. nov. occur in southern and southeastern Brazil, in the Atlantic Rainforest biome (Fig. 13).

## Remarks

*Takiyaella* gen. nov. shares some similarities with *Paraphysiana* Chiamolera, Cavichioli & Anderle, 2003 as follows: (1) crown with anterior margin rounded; (2) crown-face transition without carina; (3) frontogenal suture not reaching ocellus; (4) antennal ledge narrow and slightly prominent; (5) pronotum with posterior margin roundly excavated; and (6) forewing with dark maculae along the anal margin.

However, the new genus can be easily separated from *Paraphysiana* due to hind wing with veins  $R_{4+5}$  and  $M_{1+2}$  preapically convergent, fused at apex, forming single vein, whereas in *Paraphysiana*  $R_{4+5}$  and  $M_{1+2}$  are convergent, fused to each other, but they are divergent apically; pygofer without inner ventral processes (present in *Paraphysiana*); subgenital plates without dorsal tooth (present in *Paraphysiana*); style with preapical lobe moderately developed, whereas in *Paraphysiana* it is strongly developed and produced caudally; paraphysis absent (present in *Paraphysiana*); and the aedeagus with atrial processes (absent in *Paraphysiana*).

### *Takiyaella anomala* gen. et sp. nov.

urn:lsid:zoobank.org:act:3E2E98B6-FDAE-4452-A5E2-18957D9B57A0

Figs 1–2, 12A–B, 13

## Diagnosis

Forewing (Fig. 1D) with three dark maculae, two on clavus and one on fourth apical cell. Male pygofer (Fig. 1E) rectangular, not expanded apically. Connective (Fig. 1H) Y-shaped. Aedeagus (Fig. 1J–K) with atrial processes slender, directed posterad, with three spiniform projections; shaft flattened laterally, not expanded apically.

## Etymology

The specific epithet alludes to the singular set of morphological characteristics of this species.

## Material examined

### Holotype

BRAZIL • ♂; Rio de Janeiro, Cachoeiras de Macacu, REGUA [Reserva Ecológica de Guapiaçu], ponto 4, casa de pesquisa, trilha verde; 22°24'28.30" S, 42°44'16.10" W; alt. 296 m; 25 May 2019; R.L.C. Baptista leg.; coleta visual alta diurna [daytime high visual collection]; DZRJ-AUCH #238; DZRJ.

### Paratypes

BRAZIL – Rio de Janeiro • 1 ♂, 1 ♀; Itatiaia, PNI [Parque Nacional de Itatiaia], Lago Azul, mata, PNI-M3B; 22°27'1.10" S, 44°36'55.30" W; alt. 830 m; 1–3 Dec. 2015; Biota FAPERJ leg.; Malaise trap; MNRJ • 1 ♀; same collection data as for preceding; DZUP-083604; DZUP.

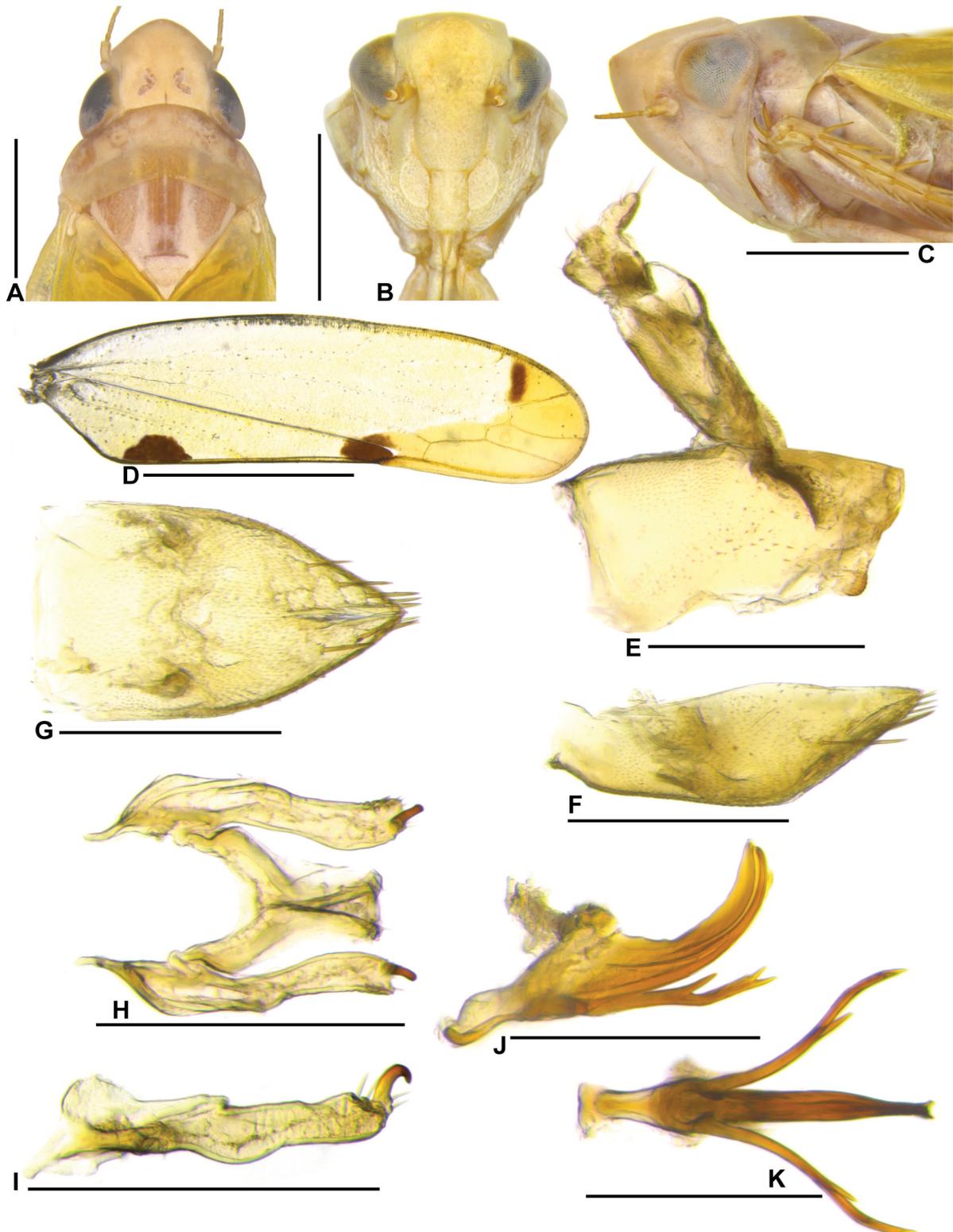
## Description

MEASUREMENTS (mm). Holotype (♂): total length 6.2. Paratypes (♂): 6.1 (n = 1); (♀) 6.7 – 6.8 (n = 2).

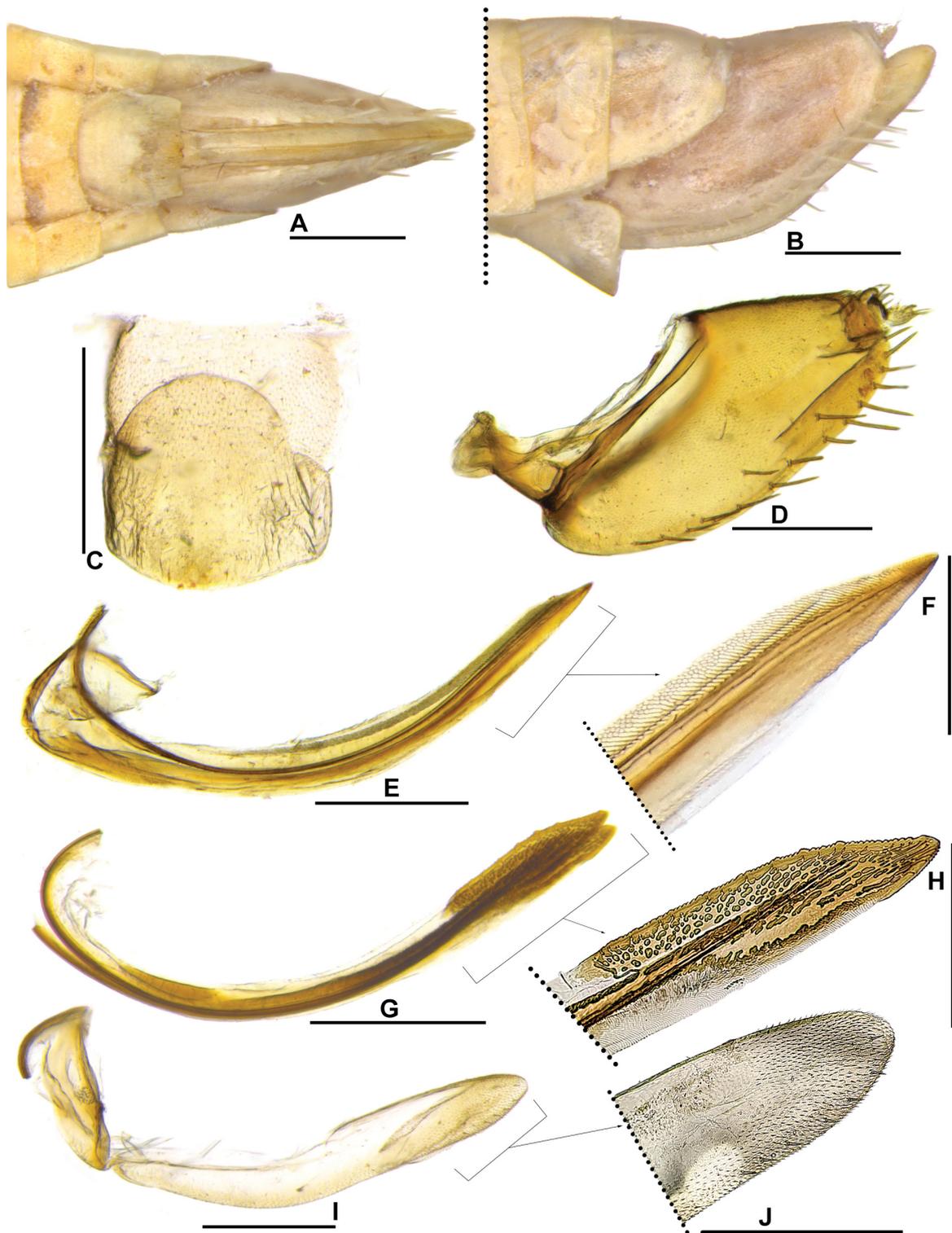
COLORATION. Pale yellow (Fig. 12A–B). Forewing (Fig. 1D) yellow, translucent, with three dark maculae: first on claval commissure between anal veins, second on apex of clavus and extending to brachial cell, and third on fourth apical cell.

HEAD AND THORAX. External morphological characters as in generic description.

MALE TERMINALIA. Pygofer, in lateral view (Fig. 1E), 1.6 × as long as maximum height, not expanded apically, basal portion slightly higher than apical portion; dorsal margin slightly convex; ventral tooth



**Fig. 1.** *Takiyaella anomala* gen. et sp. nov., ♂, holotype (DZRJ-AUCH #238). **A.** Head and thorax, dorsal view. **B.** Head, frontal view. **C.** Head and thorax, lateral view. **D.** Forewing. **E.** Pygofer and anal tube, lateral view. **F.** Valve and subgenital plate, lateral view. **G.** Valve and subgenital plate, ventral view. **H.** Styles and connective, dorsal view. **I.** Style, lateral view. **J.** Aedeagus, lateral view. **K.** Aedeagus, ventral view. Scale bars: A–C = 1.0 mm; D = 2.0 mm; E–I = 0.5 mm; J–K = 0.4 mm.



**Fig. 2.** *Takiyaella anomala* gen. et sp. nov., ♀, paratype (MNRJ). **A.** Posterior portion of abdomen, ventral view. **B.** Posterior portion of abdomen, lateral view. **C.** Sternite VII, ventral view. **D.** Pygofer and anal tube, lateral view. **E.** First valvifer and first valvula of ovipositor, lateral view. **F.** Apex of first valvula, lateral view. **G.** Second valvula of ovipositor, lateral view. **H.** Apex of second valvula, lateral view. **I.** Second valvifer and gonoplac, lateral view. **J.** Apex of gonoplac, lateral view. Scale bars: A–B = 1.0 mm; C–E, G, I = 0.5 mm; F, H, J = 0.3 mm.

prominent and rounded; caudal margin truncated; few small setae scattered on middle third. Subgenital plate, in lateral view (Fig. 1F),  $2.9 \times$  as long as maximum height, expanded medially; dorsal margin slightly convex; ventral margin oblique in the apical half; apical third strongly narrowed; in ventral view (Fig. 1G), subtriangular, lateral margins parallel on basal half and strongly converging on apical half; ventral surface with pair of uniseriate rows of 5–6 macrosetae; apex acute. Connective (Fig. 1H) Y-shaped, total length about  $\frac{3}{5}$  length of style; stem approximately as long as arms. Style (Fig. 1H–I) with dorsal margin of apodeme broadly rounded, ventral margin acutely produced anteroventrally; apophysis elongated, robust. Aedeagus (Fig. 1J–K) with pair of slender atrial processes, each process with approximately half length of shaft, directed posterad and strongly divergent in ventral view, apical third with three spiniform projections, one longer on dorsal margin, and two smaller on apex; shaft flattened laterally, curved dorsally at basal third, with pair of small subapical ventral lamellae. Anal tube (Fig. 1E) with sternite X long and tubular, without basiventral process.

FEMALE TERMINALIA. Sternite VII (Fig. 2A–C)  $1.2 \times$  as long as wide; lateral margins parallel; posterior margin widely rounded. First valvula of ovipositor (Fig. 2F) with dorsal sculptured area areolate-strigate. Other characters as in generic description.

### Remarks

*Takiyaella anomala* gen. et sp. nov. is the species that most differs from the other species of the genus, being the only one to have the forewing with a dark-brown macula in the fourth apical cell (Fig. 1D); male pygofer, in lateral view, not expanded apically, caudal margin without ventral lobe (Fig. 1E); connective Y-shaped (Fig. 1H); and aedeagus with shaft laterally compressed and not expanded apically (Fig. 1J–K).

### *Takiyaella cavichioli* gen. et sp. nov.

urn:lsid:zoobank.org:act:0E144EA1-5D79-44F8-8042-E34B81111F8D

Figs 3–4, 12C–D, 13

### Diagnosis

Male pygofer (Fig. 3E) expanded apically, with two lobes, dorsal lobe larger and subtriangular, apical lobe smaller and rounded. Aedeagus (Fig. 3J–L) with atrial processes slender, parallel and following the curvature of shaft, apex acute; shaft expanded apically, spatulate, with lateral small spiniform projections. Anal tube (Fig. 3M) with triangular basiventral process.

### Etymology

The specific epithet is a tribute to Prof. Dr Rodney Ramiro Cavichioli in recognition of his remarkable contribution to our knowledge of the Brazilian Auchenorrhyncha.

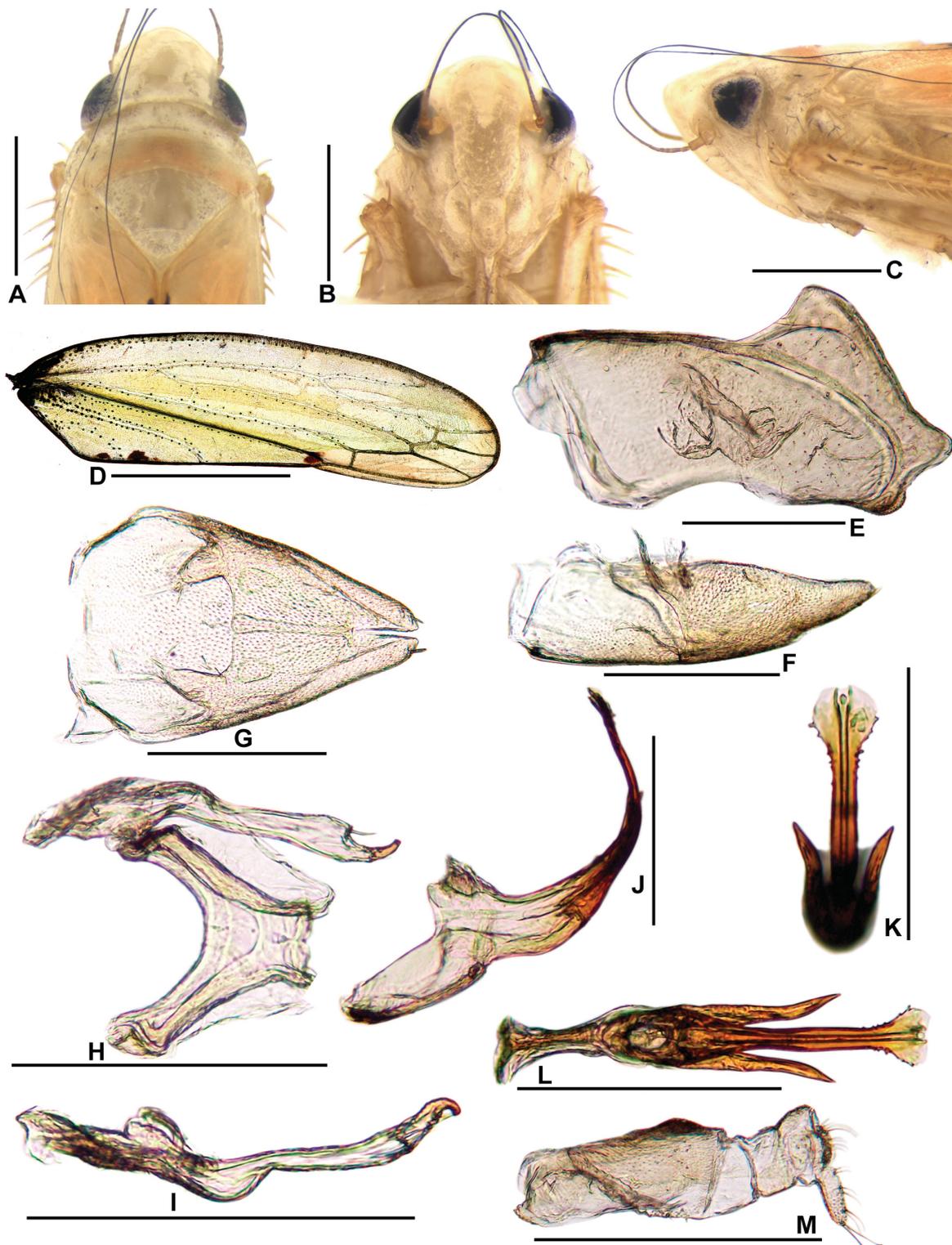
### Material examined

#### Holotype

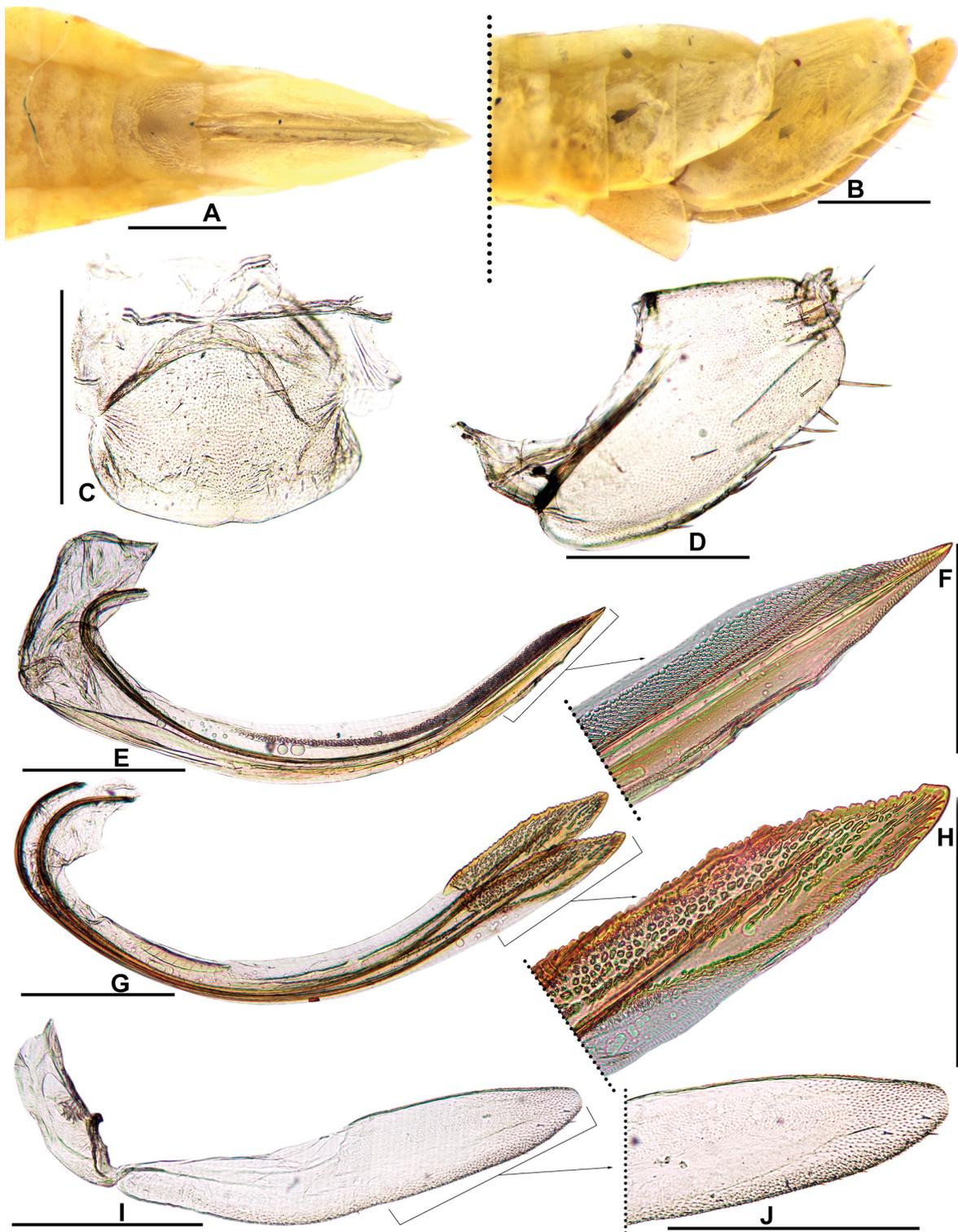
BRAZIL • ♂; PR [Paraná], S. J. [São José] dos Pinhais, Rep. [Represa] Guaricana; 25.7176° S, 48.9640° W; alt. 760 m; 9 Jan.–1 Feb. 2018; Muniz, Melo, Cavichioli and Domahovski leg.; Malaise trap; DZUP 492451; DZUP.

#### Paratypes

BRAZIL – Paraná • 1 ♂; Antonina, Res. [Reserva] Rio Cachoeira; 25.316° S, 48.696° W; alt. 50 m; 23–27 Jan. 2017; A.C. Domahovski leg.; luz solo [ground light]; DZUP 492472; DZUP • 1 ♀; same collection data as for preceding; DZUP 492471; DZUP • 1 ♀; same collection data as for preceding; DZUP 492473; DZUP • 1 ♀; Antonina, RPPN [Reserva Particular do Patrimônio Natural] Guaricana; 25.316° S,



**Fig. 3.** *Takiyaella cavichiolii* gen. et sp. nov., ♂, holotype (DZUP 492451). **A.** Head and thorax, dorsal view. **B.** Head, frontal view. **C.** Head and thorax, lateral view. **D.** Forewing. **E.** Pygofer, lateral view. **F.** Valve and subgenital plate, lateral view. **G.** Valve and subgenital plate, ventral view. **H.** Style and connective, dorsal view. **I.** Style, lateral view. **J.** Aedeagus, lateral view. **K.** Aedeagus, caudal view. **L.** Aedeagus, ventral view. **M.** Anal tube, lateral view. Scale bars: A–C = 1.0 mm; D = 2.0 mm; E–I, M = 0.5 mm; J–L = 0.4 mm.



**Fig. 4.** *Takiyaella cavichioli* gen. et sp. nov., ♀, paratype (DZUP 492477). **A.** Posterior portion of abdomen, ventral view. **B.** Posterior portion of abdomen, lateral view. **C.** Sternite VII, ventral view. **D.** Pygofer and anal tube, lateral view. **E.** First valvifer and first valvula of ovipositor, lateral view. **F.** Apex of first valvula, lateral view. **G.** Second valvula of ovipositor, lateral view. **H.** Apex of second valvula, lateral view. **I.** Second valvifer and gonoplac, lateral view. **J.** Apex of gonoplac, lateral view. Scale bars: A–B = 1.0 mm; C–E, G, I = 0.5 mm; F, H, J = 0.3 mm.

48.696° W; alt. 50 m; 23–27 Oct. 2017; A. Domahovski, G. Melo, A. Pinto and M. Savaris leg.; Malaise trap; DZUP 492477; DZUP • 1 ♂; Guaratuba, Estrada dos Castelhanos; 25°50' S, 48°56' W; alt. 790 m; 18 Oct.–2 Nov. 2003; Ivanir leg.; Malaise trap; DZRJ-AUCH #241 • 1 ♂; Morretes, P.E. [Parque Estadual] do Marumbi, caminho para Estação Eng. [Engenheiro] Lange; 25°25'41" S, 48°54'55" W; alt. 330 m; 27 Sep. 2016; A.C. Domahovski leg.; sweep; DZUP 492460; DZRJ • 1 ♀; same collection data as for preceding; DZUP 492461; DZRJ • 1 ♀; Brasil, Paraná, Morretes; 23 Feb. 2018; A.C. Domahovski leg.; sweep; DZUP 492450; DZUP • 1 ♀; Piraquara, Mananciais da Serra; 25°29'47" S, 48°58'54" W; alt. 1021 m; 21–28 Nov. 2018; A.P. Pinto, B.R. Araujo and A.C. Domahovski leg.; sweep; DZUP 083595; DZUP • 1 ♂; São José dos Pinhais, Br277 km 54 (Torre – Telepar); 25°33'18" S, 48°58'22" W; alt. 1060 m; 1–15 Oct. 2015; A.C. Domahovski and RRC [R.R.Cavichioli] leg.; Malaise trap; DZUP 492394; DZRJ • 2 ♂♂; same collection data as for preceding; 15–22 Sep. 2015; DZUP 492322 to 492323; DZUP.

### Description

MEASUREMENTS (mm). Holotype (♂): total length 6.8. Paratypes (♂): 6.5–6.8 (n = 6); (♀) 7.1–7.4 (n = 6).

COLORATION. Pale yellow (Fig. 12C–D). Forewing (Fig. 3D) translucent, with three small dark maculae on claval commissure: first, smaller, between base and second anal vein, second, between anal veins, and third on apex of clavus and extending to brachial cell; in some specimens the first pair is absent, and in one specimen, first and second pairs are absent.

HEAD AND THORAX. External morphological characters as in generic description.

MALE TERMINALIA. Pygofer, in lateral view (Fig. 3E), 1.5 × as long as maximum height, expanded apically, apical portion higher than basal portion; dorsal margin with prominent preapical subtriangular lobe; ventral tooth broadly rounded; caudal margin with ventral rounded lobe; few small setae scattered on apical half; apical portion with inner integument thickening. Subgenital plate, in lateral view (Fig. 3F), subtriangular, 3.3 × as long as maximum height, slightly expanded medially; in ventral view (Fig. 3G), subrhomboid, lateral margins converging anterad on basal one-fifth and converging towards apex on apical four-fifths; ventral surface with one or two pairs of apical macrosetae; apex slightly truncated. Connective (Fig. 3H) V-shaped, total length approximately  $\frac{2}{3}$  length of style; stem very short. Style (Fig. 3H–I) with apophysis very elongated and slender; ventral margin distinctly rounded near median third. Aedeagus (Fig. 3J–L) with pair of atrial processes parallel and following curvature of shaft, each process approximately  $\frac{1}{2}$  length of shaft, broad at base and tapering towards acute apex; shaft slightly flattened dorsoventrally, apical portion expanded laterally, spatulate, lateral margins with some small spiniform projections. Anal tube (Fig. 3M) with sternite X long and tubular, with triangular basiventral process with denticles.

FEMALE TERMINALIA. Sternite VII (Fig. 4A–C) as long as wide; posterior margin slightly excavated medially. First valvula of ovipositor (Fig. 4F) with dorsal sculptured area areolate-strigate. Other characters as in generic description.

### Remarks

*Takiyaella cavichioli* gen. et sp. nov. is most similar to *T. sexguttata* (Chiamolera & Cavichioli, 2003) gen. et comb. nov. by the shape of male pygofer with two lobes, one dorsal and one apical (Figs 3E, 10D) and the shape of the aedeagal shaft expanded apically, with lateral margins rounded, bearing several small spiniform projections (Figs 3J–L, 10I–J). However, *T. cavichioli* gen. et sp. nov. differs in having the style slender and the aedeagus with atrial processes parallel to the shaft and following its curvature (Fig. 3J), while in *T. sexguttata* gen. et comb. nov. the style is wider, and the atrial processes are shorter, not parallel to the shaft (Fig. 10I).

*Takiyaella coelhomarquesae* gen. et sp. nov.

urn:lsid:zoobank.org:act:327A360B-940E-48B3-A681-37423842E88E

Figs 5–6, 12E–F, 13

**Diagnosis**

Male pygofer (Fig. 5E) expanded apically, with apical lobe. Aedeagus (Fig. 5J–K) with two pairs of slender atrial processes anterior to shaft curvature, one pair curved dorsally, and the second directed ventrally; shaft with apical portion expanded laterally forming a small process on each side; anal tube (Fig. 5L) with basiventral process truncated with few denticles.

**Etymology**

The specific epithet is a tribute to Prof. Dr Ana Paula Coelho-Marques in recognition of her remarkable contribution to our knowledge of the Brazilian Auchenorrhyncha, mainly in the study of neocoelidiines.

**Material examined**

**Holotype**

BRAZIL • ♂; Rio de Janeiro, Nova Friburgo, Macaé de Cima; alt. 1250 m; Nov.–Dec. 2009; [P.C.] Grossi leg.; DZUP-083605; DZUP.

**Paratypes**

BRAZIL – Rio de Janeiro • 1 ♂, 2 ♀♀; same collection data as for holotype; DZUP-083606; DZUP • 1 ♂, same collection data as for holotype; DZRJ-AUCH #242; DZRJ • 1 ♀; same collection data as for holotype; DZRJ-AUCH #243; DZRJ.

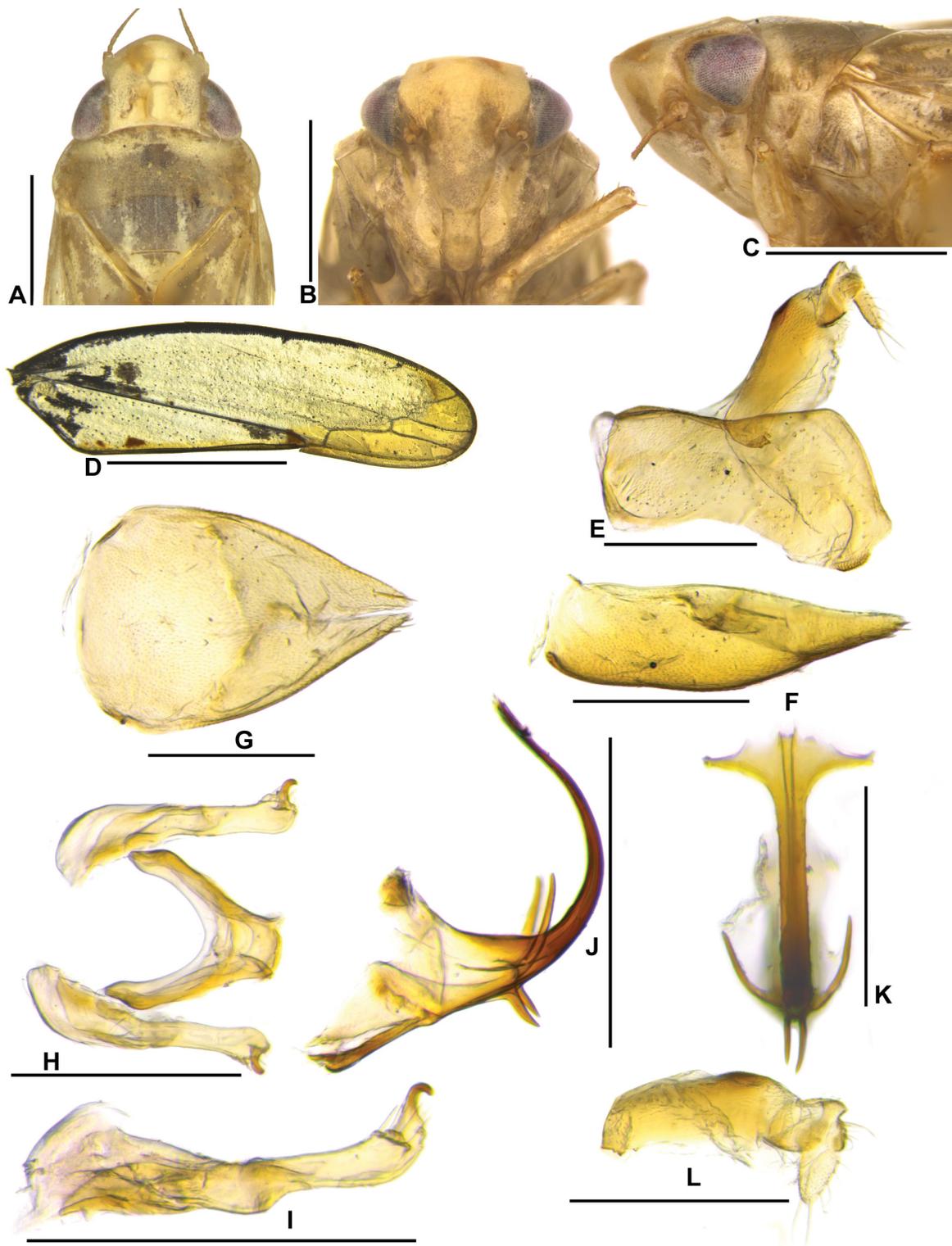
**Description**

MEASUREMENTS (mm). Holotype (♂): total length 6.3. Paratypes (♂): 6.2–6.5 (n = 2); (♀) 6.9–7.1 (n = 3).

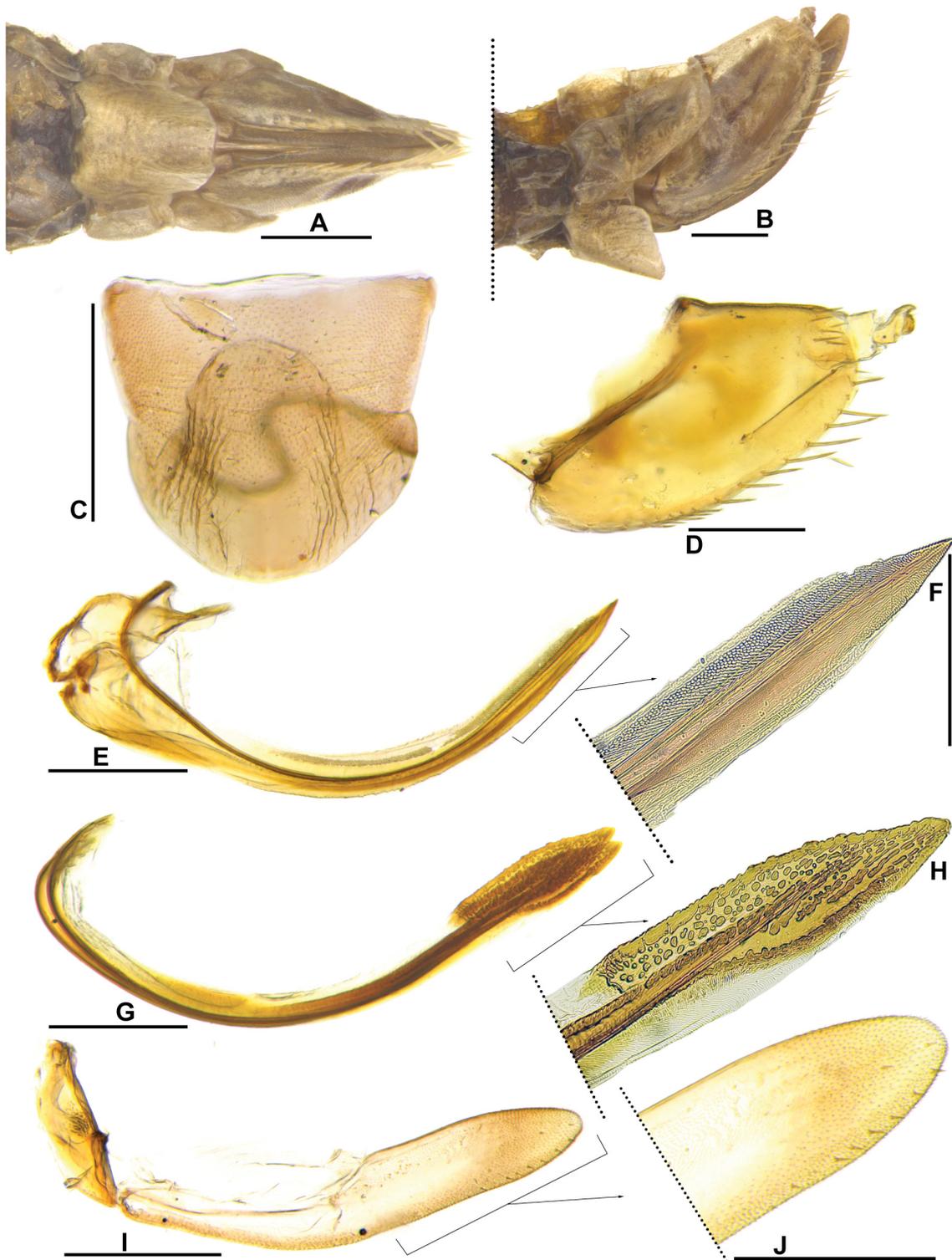
COLORATION. Pale yellow (Fig. 12E–F). Forewing (Fig. 5D) translucent, with three small dark maculae on claval commissure: first, smaller, between base and second anal vein, second, between anal veins, and third on apex of clavus and extending to brachial cell.

HEAD AND THORAX. External morphological characters as in generic description.

MALE TERMINALIA. Pygofer, in lateral view (Fig. 5E), 1.7 × as long as maximum height, expanded apically, apical portion higher than basal portion; dorsal margin slightly concave medially; ventral tooth slightly rounded; caudal margin truncated with small ventral rounded lobe; few small setae scattered near ventral margin and apical half; apical portion with inner integument thickening. Subgenital plate, in lateral view (Fig. 5F), subtriangular, 3.3 × as long as maximum height; in ventral view (Fig. 5G), subovoid, lateral margins converging towards apex; ventral surface with pair of uniseriate rows of 5–6 macrosetae; apex acutely rounded. Connective (Fig. 5H) V-shaped, total length approximately  $\frac{2}{3}$  length of style; stem very short. Style (Fig. 5H–I) with dorsal margin of apodeme broadly rounded; apophysis elongated and robust. Aedeagus (Fig. 5J–K) with two pairs of slender atrial processes with acute apices: first more dorsal in comparison to second, longer, approximately  $\frac{1}{3}$  length of shaft, curved dorsally, anterior to shaft curvature; second pair, shorter, approximately  $\frac{1}{3}$  length of first, directed ventrally; shaft tubular, slightly flattened dorsoventrally at apex, ventral surface with longitudinal row of denticles on each side, extending from base to apex, apical portion expanded laterally forming small process on each side. Anal tube (Fig. 5E, L) with sternite X long and tubular, with basiventral process truncated, with few denticles.



**Fig. 5.** *Takiyaella coelhomarquesae* gen. et sp. nov., ♂, holotype (DZUP-083605). A. Head and thorax, dorsal view. B. Head, frontal view. C. Head and thorax, lateral view. D. Forewing. E. Pygofer and anal tube, lateral view. F. Valve and subgenital plate, lateral view. G. Valve and subgenital plate, ventral view. H. Styles and connective, dorsal view. I. Style, lateral view. J. Aedeagus, lateral view. K. Aedeagus, caudal view. L. Anal tube, lateral view. Scale bars: A–C = 1.0 mm; D = 2.0 mm; E–J, L = 0.5 mm; K = 0.4 mm.



**Fig. 6.** *Takiyaella coelhomarquesae* gen. et sp. nov., ♀, paratype (DZUP-083606). **A.** Posterior portion of abdomen, ventral view. **B.** Posterior portion of abdomen, lateral view. **C.** Sternite VII, ventral view. **D.** Pygofer and anal tube, lateral view. **E.** First valvifer and first valvula of ovipositor, lateral view. **F.** Apex of first valvula, lateral view. **G.** Second valvula of ovipositor, lateral view. **H.** Apex of second valvula, lateral view. **I.** Second valvifer and gonoplac, lateral view. **J.** Apex of gonoplac, lateral view. Scale bars: A–B = 1.0 mm; C–E, G, I = 0.5 mm; F, H, J = 0.3 mm.

FEMALE TERMINALIA. Sternite VII (Fig. 6A–C) as long as wide; lateral margins constricted medially. First valvula of ovipositor (Fig. 6F) with dorsal sculptured area baculiform. Other characters as in generic description.

### Remarks

*Takiyaella coelhomarquesae* gen. et sp. nov. is most similar to *T. daniela* gen. et sp. nov. by the shape of apex of aedeagus expanded laterally forming a small process on each side (Figs 5K, 7K). However, *T. coelhomarquesae* gen. et sp. nov. differs by the dorsal margin of the male pygofer without distinct lobe (Fig. 5E); aedeagus with two pairs of atrial processes (Fig. 5J) and anal tube with basiventral process (Fig. 5L). While *T. daniela* gen. et sp. nov. have the dorsal margin of the male pygofer with distinct lobe (Fig. 7E); aedeagus with a pair of bifid atrial processes (Fig. 7J) and anal tube without basiventral process (Fig. 7E).

### *Takiyaella daniela* gen. et sp. nov.

urn:lsid:zoobank.org:act:3E9E3765-EC80-4B1E-BBD2-0BE402754538

Figs 7, 12G–H, 13

### Diagnosis

Male pygofer (Fig. 7E) expanded apically, with two lobes, a larger dorsal lobe and a smaller subacute apical lobe. Aedeagus (Fig. 7J–K) with atrial processes bifid, dorsal ramus about 3 × as large as ventral ramus, both acute. shaft expanded laterally forming small process on each side.

### Etymology

The specific epithet is a tribute to Prof. Dr Daniela Maeda Takiya in recognition of her remarkable contribution to our knowledge of the Brazilian Auchenorrhyncha, and also in gratitude for her great friendship and for bringing the first author to the study of leafhoppers. The species epithet is treated as a noun in apposition.

### Material examined

#### Holotype

BRAZIL • ♂; Rio de Janeiro, [Itatiaia], P[arque] N[acional] do Itatiaia, Travessia Rui Braga; 22°25'50.4" S, 44°37'12.6" W; alt. 1100 m; 12 Oct. 2003; D.M. Takiya, C. Moraes and C.C. Gonçalves leg.; sweep; DZRJ-AUCH #244; DZRJ.

#### Paratypes

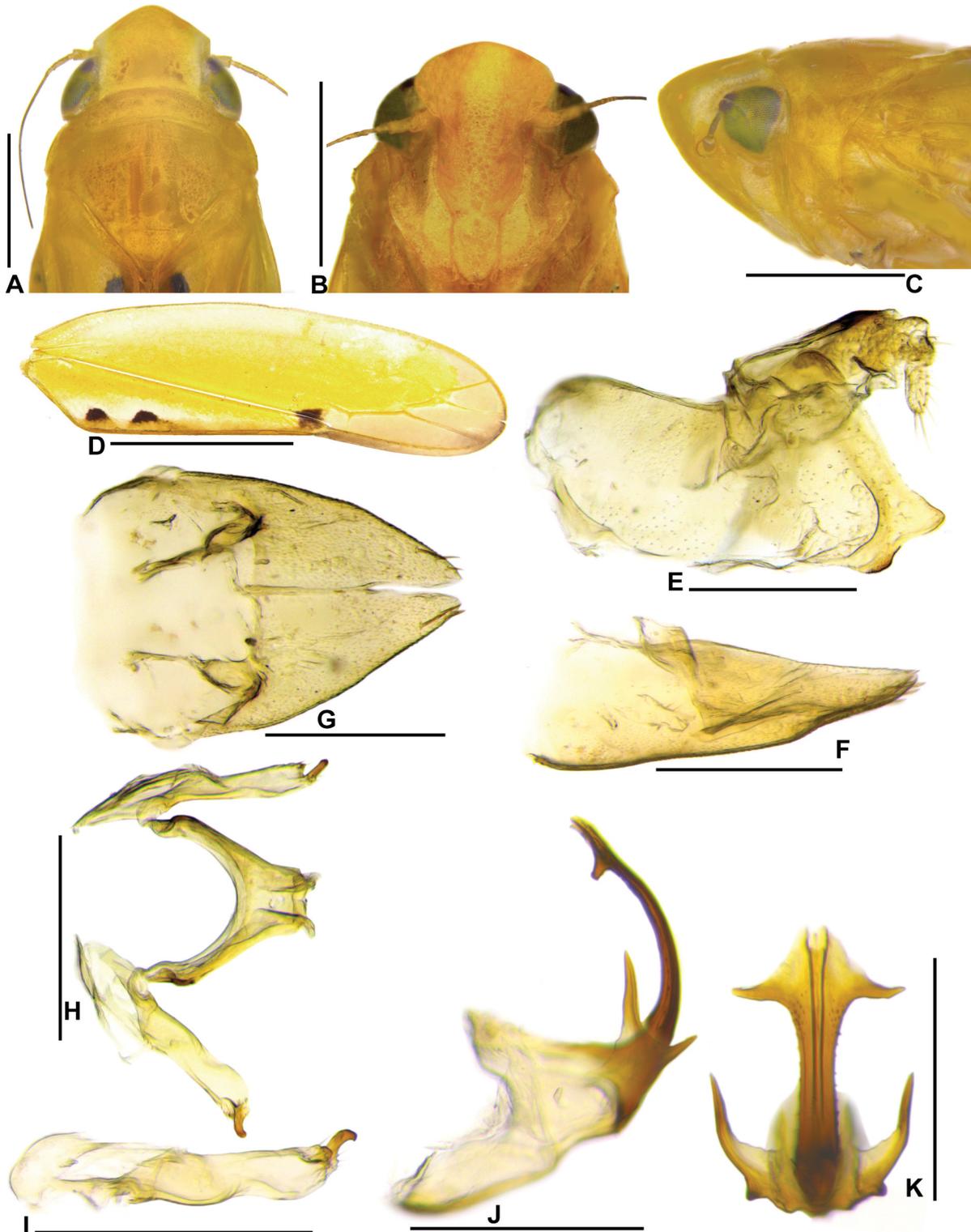
BRAZIL – Rio de Janeiro • 1 ♂; Itatiaia, Parque Nacional do Itatiaia, Setor Lago Azul, mata; 22°27'1.10" S, 44°36'55.30" W; alt. 830 m; 1 Jul.–3 Aug. 2015; Biota FAPERJ leg.; malaise; MNRJ • 1 ♂; Itatiaia, P[arque] N[acional] do Itatiaia, Alojamento 2; 22°27'7.86" S, 44°36'27.95" W; alt. 840 m; 25–29 Oct. 2019; A.C. Domahovski leg.; sweep; DZUP-083607; DZUP.

### Description

MEASUREMENTS (mm). Holotype (♂): total length 6.5. Paratypes (♂): 6.3–6.6 (n = 2).

COLORATION. Pale yellow (Fig. 12G–H). Forewing (Fig. 7D) translucent, with three small dark maculae on claval commissure: first, between base and second anal vein; second between anal veins and third on apex of clavus and extending to brachial cell.

HEAD AND THORAX. External morphological characters as in generic description.



**Fig. 7.** *Takiyaella daniela* gen. et sp. nov., ♂, holotype (DZRJ-AUCH #244). **A.** Head and thorax, dorsal view. **B.** Head, frontal view. **C.** Head and thorax, lateral view. **D.** Forewing. **E.** Pygofer and anal tube, lateral view. **F.** Valve and subgenital plate, lateral view. **G.** Valve and subgenital plate, ventral view. **H.** Styles and connective, dorsal view. **I.** Style, lateral view. **J.** Aedeagus, lateral view. **K.** Aedeagus, caudal view. Scale bars: A–C = 1.0 mm; D = 2.0 mm; E–I = 0.5 mm; J–K = 0.4 mm.

MALE TERMINALIA. Pygofer, in lateral view (Fig. 7E),  $1.8 \times$  as long as maximum height, expanded apically; dorsal margin with prominent preapical lobe; caudal margin with ventral subacute lobe; ventral tooth broadly rounded; apical portion with inner integument thickening. Subgenital plate, in lateral view (Fig. 7F), subtriangular,  $2.9 \times$  as long as maximum height; in ventral view (Fig. 7G), subovoid, lateral margins converging towards apex; ventral surface with pair of uniseriate rows of 3–4 macrosetae; apex acute. Connective (Fig. 7H) V-shaped, total length approximately  $\frac{2}{3}$  length of style; stem very short. Style (Fig. 7H–I) with apophysis elongated and robust. Aedeagus (Fig. 7J–K) with pair of bifid atrial process: dorsal ramus about  $\frac{1}{3}$  length of shaft, directed dorsally, anterior to curvature of shaft; ventral ramus approximately  $\frac{1}{3}$  length of dorsal ramus, directed posteriorly, posterior to curvature of shaft; shaft tubular, slightly flattened dorsoventrally at apex, ventral surface with longitudinal row of denticles on each side, extending from base to apex, apical portion expanded laterally forming small process on each side. Anal tube (Fig. 7E) with sternite X long and tubular, without basiventral process.

FEMALE TERMINALIA. Female unknown.

### Remarks

*Takiyaella daniela* gen. et sp. nov. is easily distinguished from other species of the genus by having atrial process bifid apically (Fig. 7J–K).

### *Takiyaella mejdalanii* gen. et sp. nov.

urn:lsid:zoobank.org:act:83EC235F-172B-4A24-BC70-66CF0586F9C9

Figs 8–9, 12I–J, 13

### Diagnosis

Male pygofer (Fig. 8E) strongly expanded apically, with apical lobe. Aedeagus (Fig. 8J–K) with atrial processes large, flattened laterally, directed caudally and bent dorsally; shaft short, flattened laterally on basal half and dorsoventrally on apical half, apex expanded with laterodorsal spiniform projections. Anal tube (Fig. 8E) with basal portion produced anteroventrally bearing moderately long basiventral acute teeth.

### Etymology

The specific epithet is a tribute to Prof. Dr Gabriel Mejdalani in recognition of his remarkable contribution to our knowledge of the Brazilian Cicadellidae.

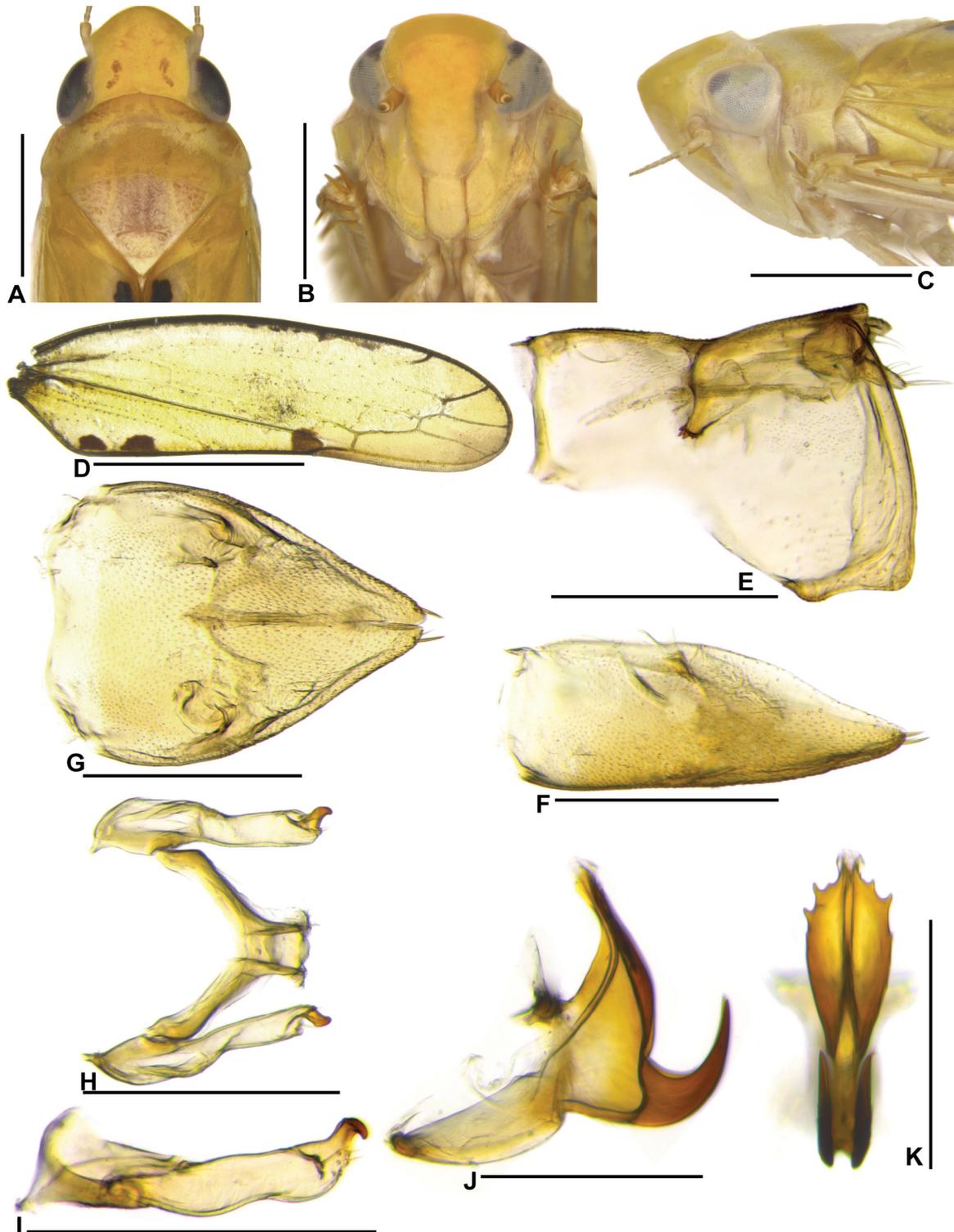
### Material examined

#### Holotype

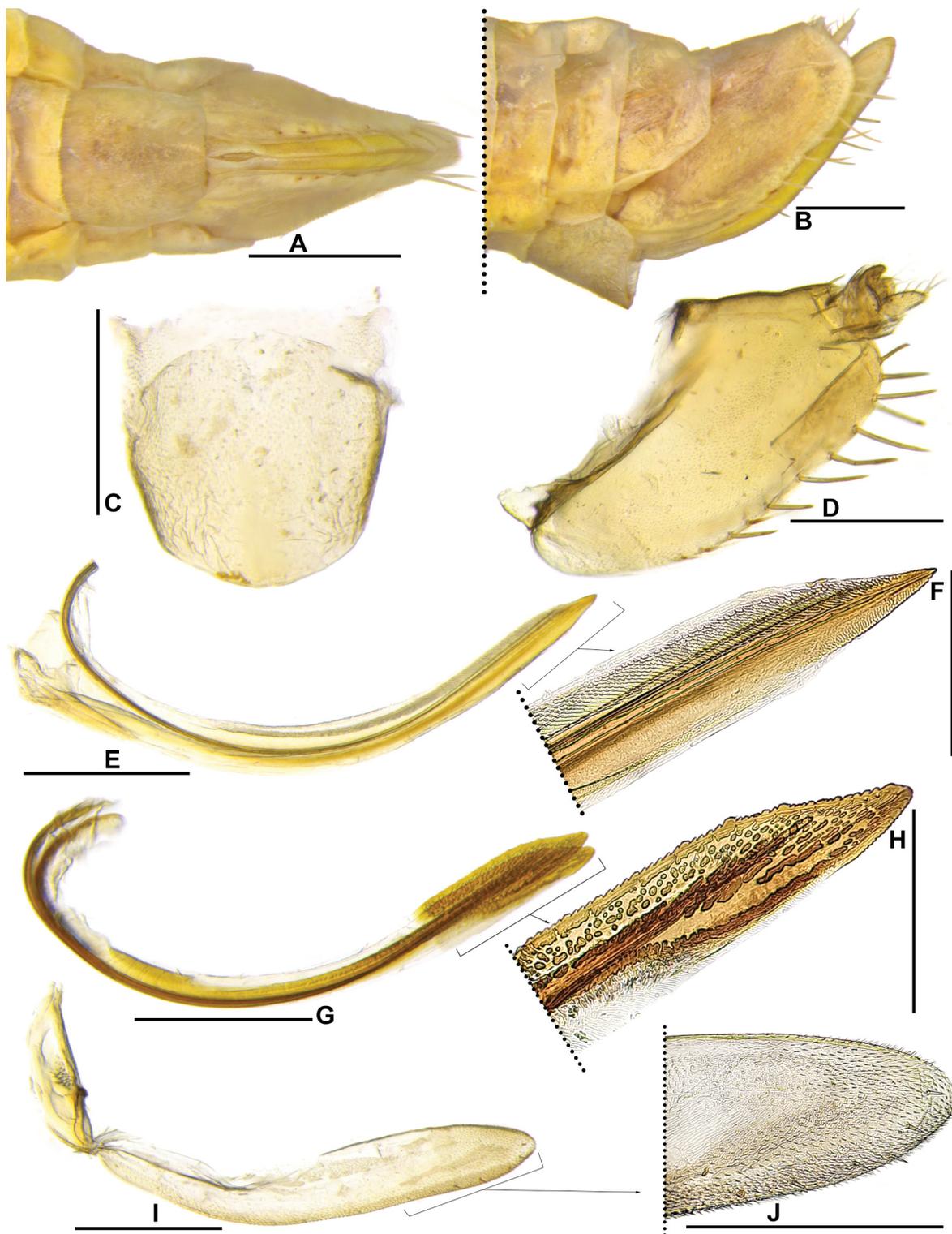
BRAZIL • ♂; Minas Gerais, Catas Altas, R[eserva] P[articular do] P[atrimônio] N[atural] Santuário do Caraça, Ribeirão Caraça, Cascatona;  $20^{\circ}4'17.8''$  S,  $43^{\circ}29'17.7''$  W; alt. 1200 m; 17 Mar. 2015; A.L.D. Ferreira leg.; sweep; DZRJ-AUCH #246; DZRJ.

#### Paratypes

BRAZIL – Minas Gerais • 1 ♀; same collection data as for holotype; DZRJ-AUCH #247; DZRJ • 1 ♂; Catas Altas, RPPN Santuário do Caraça, Trilha Bocaina;  $20^{\circ}6'35.2''$  S,  $43^{\circ}29'12''$  W; alt. 1289 m; 16 Mar. 2015; C.H. Dietrich leg.; sweep; DZRJ-AUCH #248; DZRJ • 1 ♂; São Gonçalo do Rio de Baixo, Estação Ambiental de Peti, Cemig; 21 Feb. 2002; A.F. Kumagai leg.; Malaise trap; DZUP-083608; DZUP • 1 ♂; same collection data as for preceding; 29 Nov. 2002; DZUP-083609; DZUP • 1 ♂; same collection data as for preceding; 13 Dec. 2002; DZUP-083610; DZUP • 1 ♀; same collection data as for preceding; 24 Jan. 2003; DZUP-083611; DZUP.



**Fig. 8.** *Takiyaella mejdalanii* gen. et sp. nov., ♂, holotype (DZRJ-AUCH #246). **A.** Head and thorax, dorsal view. **B.** Head, frontal view. **C.** Head and thorax, lateral view. **D.** Forewing. **E.** Pygofer and anal tube, lateral view. **F.** Valve and subgenital plate, lateral view. **G.** Valve and subgenital plate, ventral view. **H.** Styles and connective, dorsal view. **I.** Style, lateral view. **J.** Aedeagus, lateral view. **K.** Aedeagus, caudal view. Scale bars: A–C = 1.0 mm; D = 2.0 mm; E–I = 0.5 mm; J–K = 0.4 mm.



**Fig. 9.** *Takiyaella mejdalanii* gen. et sp. nov., ♀, paratype (DZRJ-AUCH #247). **A.** Posterior portion of abdomen, ventral view. **B.** Posterior portion of abdomen, lateral view. **C.** Sternite VII, ventral view. **D.** Pygofer and anal tube, lateral view. **E.** First valvula of ovipositor, lateral view. **F.** Apex of first valvula, lateral view. **G.** Second valvula of ovipositor, lateral view. **H.** Apex of second valvula, lateral view. **I.** Second valvifer and gonoplac, lateral view. **J.** Apex of gonoplac, lateral view. Scale bars: A–B = 1.0 mm; C–E, G, I = 0.5 mm; F, H, J = 0.3 mm.

## Description

MEASUREMENTS (mm). Holotype (♂): total length 6. Paratypes (♂): 6.0–6.5 (n = 4); (♀) 6.8–6.9 (n = 2).

COLORATION. Pale yellow (Fig. 12I–J). Forewing (Fig. 8D) translucent, with three dark maculae on claval commissure: first, between base and second anal vein; second, between anal veins and third on apex of clavus and extending to brachial cell.

HEAD AND THORAX. External morphological characters as in generic description.

MALE TERMINALIA. Pygofer, in lateral view (Fig. 8E),  $1.3 \times$  as long as maximum height, strongly expanded apically, apical portion twice as high as basal portion; dorsal margin slightly concave medially; caudal margin truncated with small ventral rounded lobe; ventral tooth slightly rounded; apical portion with inner integument thickening. Subgenital plate, in lateral view (Fig. 8F), subtriangular,  $2.6 \times$  as long as maximum height, narrowing at apical fourth; in ventral view (Fig. 8G), cordiform, lateral margins converging towards apex; ventral surface with pair of uniseriate rows of 2–3 macrosetae; apex acutely rounded. Connective (Fig. 8H) V-shaped, total length approximately  $\frac{2}{3}$  length of style; stem short. Style (Fig. 8H–I) with dorsal margin of apodeme rounded; apophysis elongated and robust. Aedeagus (Fig. 8J–K) with pair of large atrial processes, approximately  $\frac{1}{2}$  length of shaft, flattened laterally, posterior to curvature of the shaft, directed caudally and bent dorsally, wide at base and narrowing towards acute apex; shaft short, flattened laterally on basal half and dorsoventrally on apical half; apex slightly expanded with 2–3 pairs of laterodorsal spiniform projections. Anal tube (Fig. 8E) with sternite X long and tubular, basal portion produced anteroventrally bearing moderately long basiventral acute teeth.

FEMALE TERMINALIA. Sternite VII (Fig. 9A–C) slightly wider than long; lateral margins parallel. First valvula of ovipositor (Fig. 6F) with dorsal sculptured area areolate-strigate. Other characters as in generic description.

## Remarks

*Takiyaella mejdalanii* gen. et sp. nov. resembles *T. cavichioli* gen. et sp. nov. and *T. sexguttata* gen. et comb. nov. by the apical portion of the aedeagus with lateral spiniform projections (Figs 3K, 8K, 10J). However, *T. mejdalanii* gen. et sp. nov. differs from other species of the genus by the shape of the male pygofer, strongly expanded apically (Fig. 8E) and by the shape and direction of the atrial processes of the aedeagus (Fig. 8J–K).

*Takiyaella sexguttata* (Chiamolera & Cavichioli, 2003) gen. et comb. nov.

Figs 10–11, 12K–M, 13

*Xenocoelidia sexguttata* Chiamolera & Cavichioli, 2003: 199: figs 1–7.

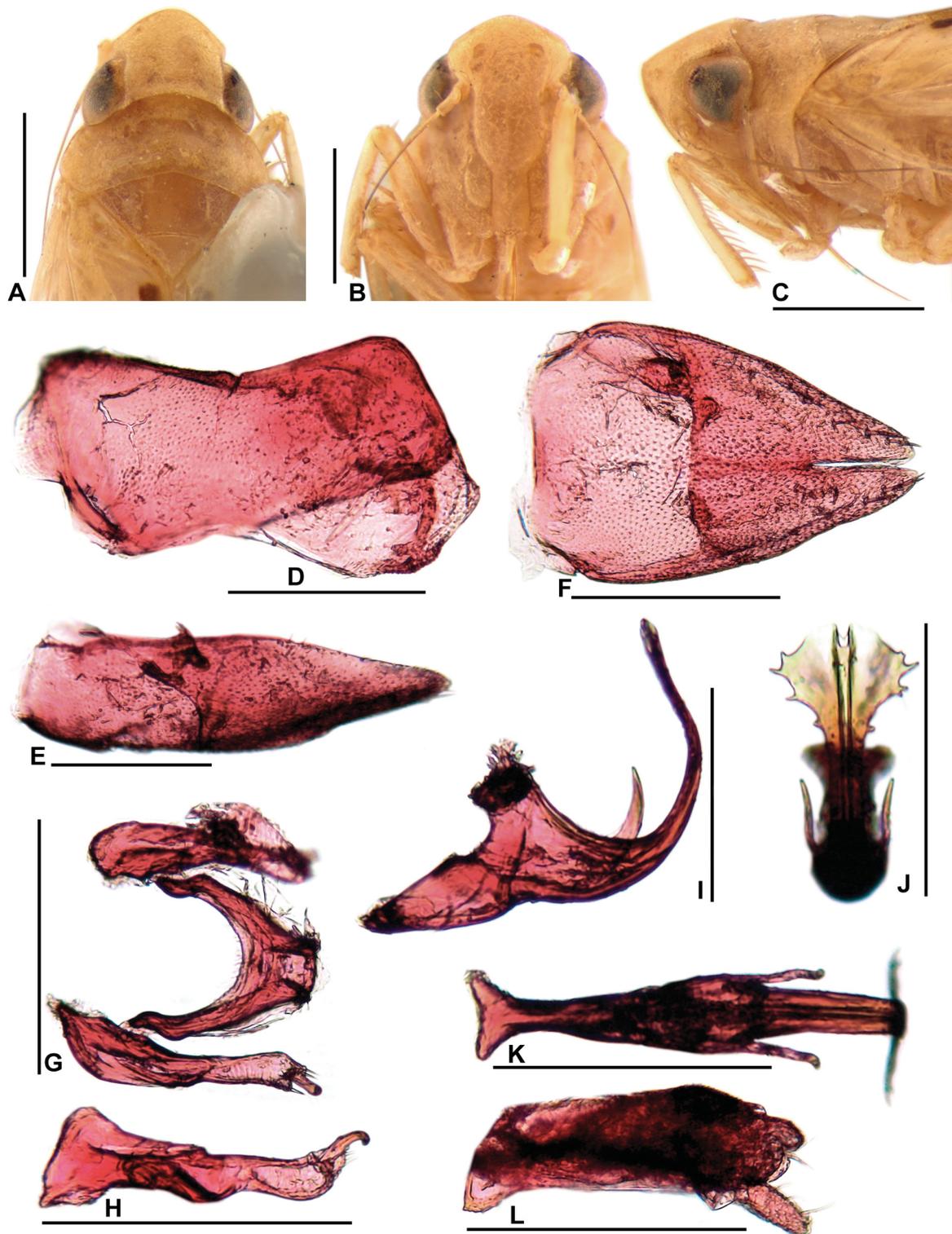
## Diagnosis

Male pygofer (Fig. 10D) expanded apically, dorsal margin with small rounded lobe, caudal margin with ventral rounded lobe. Aedeagus (Fig. 10I–K) with atrial processes slender, curved dorsally, not following the curvature of shaft; shaft expanded apically, spatulate, with small lateral spiniform projections; anal tube (Fig. 10L) with basiventral process triangular.

## Material examined

### Holotype

BRAZIL • ♂; Rio de Janeiro, Silva Jardim; Mar. 1974; F.M. Oliveira leg.; DZUP-082927; DZUP.



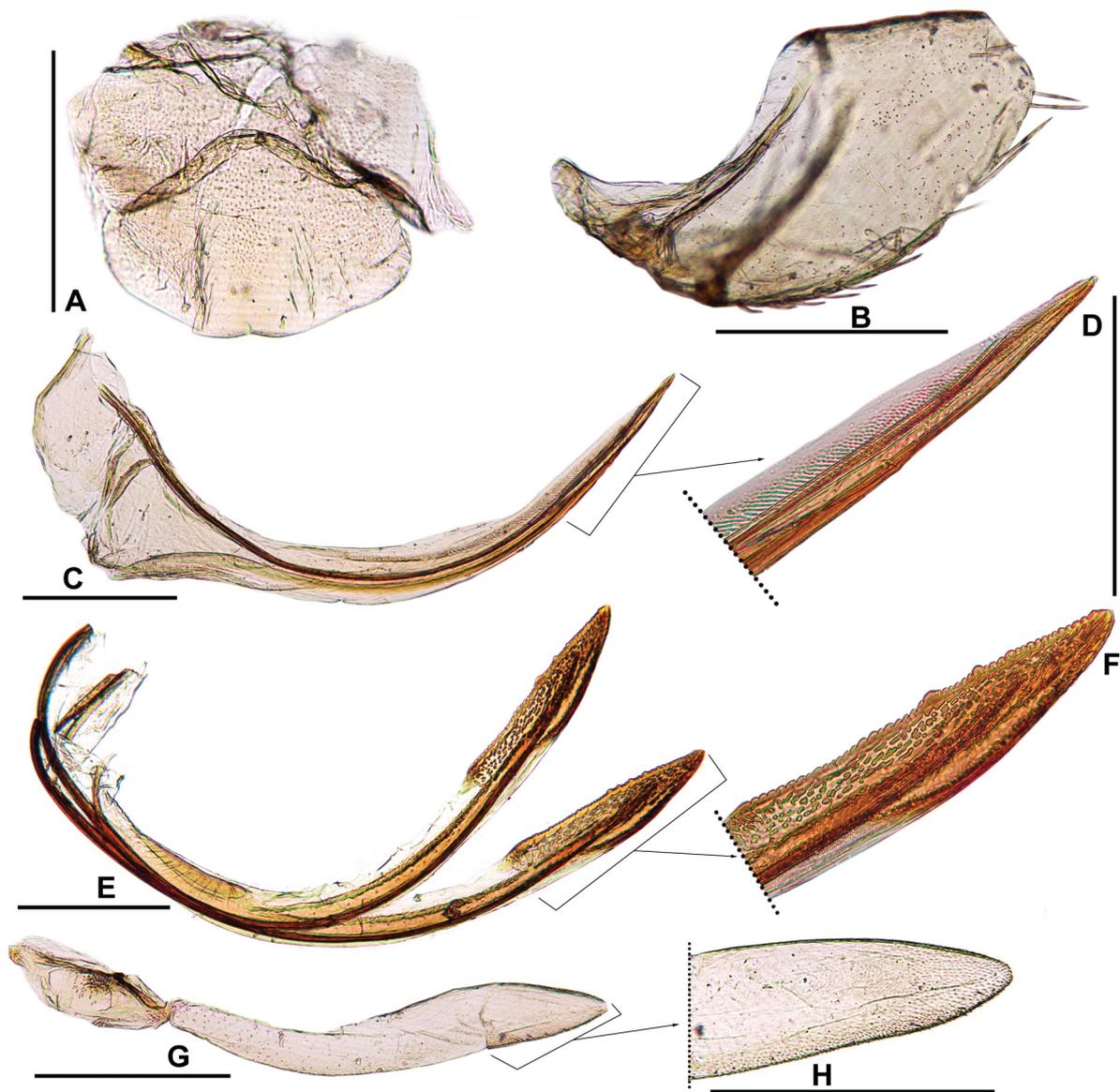
**Fig. 10.** *Takiyaella sexguttata* (Chiamolera & Cavichioli, 2003) gen. et comb. nov., ♂, holotype (DZUP-082927). **A.** Head and thorax, dorsal view. **B.** Head, frontal view. **C.** Head and thorax, lateral view. **D.** Pygofer, lateral view. **E.** Valve and subgenital plate, lateral view. **F.** Valve and subgenital plate, ventral view. **G.** Styles and connective, dorsal view. **H.** Style, lateral view. **I.** Aedeagus, lateral view. **J.** Aedeagus, caudal view. **K.** Aedeagus, ventral view. **L.** Anal tube, lateral view. Scale bars: A–C = 1.0 mm; D–H, L = 0.5 mm; I–K = 0.4 mm.

**Paratypes**

BRAZIL – Rio de Janeiro • 1 ♂; same collection data as for holotype; DZUP-492337; DZUP • 1 ♀; same collection data as for holotype; VIII.1975; DZUP-492336; DZUP.

**Description**

MEASUREMENTS (mm). Holotype (♂): total length 6.1. Paratypes (♂): 6.1 (n = 1); (♀) 6.7 (n = 1).



**Fig. 11.** *Takiyaella sexguttata* (Chiamolera & Cavichioli, 2003) gen. et comb. nov., ♀, paratype (DZUP-492337). **A.** Sternite VII, ventral view. **B.** Pygofer and anal tube, lateral view. **C.** First valvula of ovipositor, lateral view. **D.** Apex of first valvula, lateral view. **E.** Second valvula of ovipositor, lateral view. **F.** Apex of second valvula, lateral view. **G.** Second valvifer and gonoplac, lateral view. **H.** Apex of gonoplac, lateral view. Scale bars: A–C, E, G = 0.5 mm; D, F, H = 0.3 mm.



**Fig. 12.** Habitus of type specimens, dorsal and lateral view, respectively. **A–B.** *Takiyaella anomala* gen. et sp. nov., ♂, holotype (DZRJ-AUCH #238). **C–D.** *T. cavichioli* gen. et sp. nov., ♂, holotype (DZUP 492451). **E–F.** *T. coelhomarquesae* gen. et sp. nov., ♂, holotype (DZUP-083605). **G–H.** *T. daniela* gen. et sp. nov., ♂, holotype (DZRJ-AUCH #244). **I–J.** *T. mejdalanii* gen. et sp. nov., ♂, holotype (DZRJ-AUCH #246). **K–L.** *T. sexguttata* (Chiamolera & Cavichioli, 2003) gen. et comb. nov., ♂, holotype (DZUP-082927). **M.** Labels of the holotype of *Xenocoelidia sexguttata*. Scale bars: A–L = 2.0 mm.

**COLORATION.** Pale yellow (Fig. 12K–L). Forewing (Fig. 12K–L) translucent, with three dark maculae on claval commissure: first, between base and second anal vein; second, between anal veins and third on apex of clavus and extending to brachial cell.

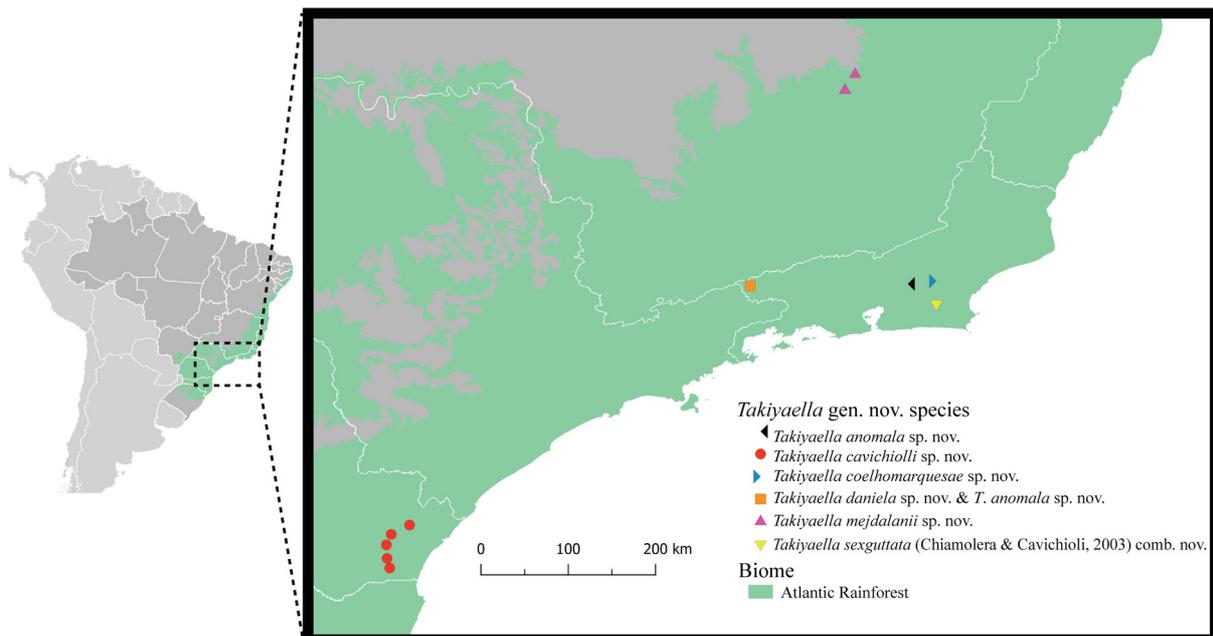
**HEAD AND THORAX.** External morphological characters as in generic description.

**MALE TERMINALIA.** Pygofer, in lateral view (Fig. 10D),  $1.7 \times$  as long as maximum height, expanded apically; dorsal margin concave medially with small preapical rounded lobe; caudal margin truncated with small ventral rounded lobe; ventral tooth slightly rounded; apical portion with inner integument thickening. Subgenital plate, in lateral view (Fig. 10E), subtriangular,  $3.6 \times$  as long as maximum height, narrowing at apical fourth; in ventral view (Fig. 10F), subrhomboid, lateral margins converging towards apex; ventral surface with pair of uniseriate rows of 4–5 macrosetae; apex acutely rounded. Connective (Fig. 10G) V-shaped, total length approximately  $\frac{2}{3}$  length of style; stem short. Style (Fig. 10G–H) with dorsal margin of apodeme rounded; apophysis elongated and robust. Aedeagus (Fig. 10I–K) with pair of atrial processes curved dorsally, with  $\frac{1}{3}$  length of shaft, anterior to curvature of shaft and not following its curvature broad at base and tapering towards apex; shaft slightly flattened dorsoventrally, apical portion expanded laterally, spatulate, lateral margins with some small spiniform projections. Anal tube (Fig. 10L) with sternite X long and tubular, basal portion with basiventral process triangular, with few denticles.

**FEMALE TERMINALIA.** Sternite VII (Fig. 11A) slightly wider than long; lateral margins constricted medially; posterior margin slightly emarginated. First valvula of ovipositor (Fig. 11D) with dorsal sculptured area areolate-strigate. Other characters as in generic description.

### Remarks

*Xenocoelidia sexguttata* was described by Chiamolera & Cavichioli (2003) based on two males and one female from Rio de Janeiro, Brazil. Our study of the *X. sexguttata* types (Figs 10–11, 12K–L) indicated the following morphological incongruities with the other species of *Xenocoelidia*: (1) male pygofer with



**Fig. 13.** Distribution map of all known species of *Takiyaella* gen. nov.

caudal margin with small lobe without robust setae (Fig. 10D), whereas in other species of *Xenocoelidia* the caudal margin of pygofer is broadly rounded bearing several small and robust setae; (2) subgenital plates fused to each other in the basal two-thirds, with only the apical third being free (Fig. 10F), while in other species the subgenital plates are fused only at base, being free for most of its length; (3) connective with stem short (Fig. 10G), while in other species the connective is Y-shaped, with stem long; (4) style with preapical lobe moderately developed and slightly produced posterad (Fig. 10H), whereas other species of *Xenocoelidia* have the preapical lobe strongly developed and expanded laterally; and (5) aedeagus with shaft moderately long, wider at base, bearing atrial processes (Fig. 10I), while in other species of *Xenocoelidia* the aedeagus lacks atrial process, and the aedeagal shaft is very long and narrow in almost all its length. Based on these differences, we propose the transfer of *X. sexguttata* to *Takiyaella* gen nov.

**Key to males of *Takiyaella* gen. nov.**

1. Forewing with black macula on fourth apical cell (Fig. 1D); pygofer not expanded apically (Fig. 1E); connective Y-shaped (Fig. 1H); aedeagal shaft with apical portion not expanded laterally (Fig. 1J–K) ..... *T. anomala* gen. et sp. nov.
  - Forewing without black macula on fourth apical cell (Figs 3D, 7D); pygofer expanded apically (Figs 5E, 8E); connective V-shaped (Figs 5H, 10G); aedeagal shaft with apical portion expanded laterally (Figs 7K, 8K) ..... 2
2. Aedeagus with apex spatulate, lateral margins bearing small spiniform projections (Figs 3K, 8K, 10J) ..... 3
  - Aedeagus expanded apically forming a small lateral process on each side (Figs 5K, 7K) ..... 5
3. Pygofer strongly expanded apically, dorsal margin without distinct lobe (Fig. 8E); aedeagus short, shaft flattened laterally on basal half, atrial processes, in lateral view, posterior to shaft curvature (Fig. 8J) ..... *T. mejdalanii* gen. et sp. nov.
  - Pygofer moderately expanded apically, dorsal margin with distinct lobe (Figs 3E, 10D); aedeagus long, shaft tubular on basal half, atrial processes, in lateral view, anterior or parallel to shaft curvature (Figs 3J, 10I) ..... 4
4. Aedeagus with atrial processes parallel to shaft and following its curvature (Fig. 3J) .....
  - ..... *T. cavichioli* gen. et sp. nov.
  - Aedeagus with atrial processes anterior to the shaft curvature (Fig. 10I) .....
    - ..... *T. sexguttata* (Chiamolera & Cavichioli, 2003) gen. et comb. nov.
5. Aedeagus with two pairs of atrial processes (Fig. 5J–K) ..... *T. coelhomarquesae* gen. et sp. nov.
  - Aedeagus with a pair of bifid atrial processes (Fig. 7J–K) ..... *T. daniela* gen. et sp. nov.

**Discussion**

The six species treated herein show a different combination of features from those present in the currently recognized genera, so that the establishment of a new genus was necessary to include them. *Takiyaella* gen. nov. belongs to the group of genera without a carina at the crown-face transition, along with *Xenocoelidiana* Marques-Costa & Cavichioli, 2006, *Deltocoelidia* Kramer, 1961, *Paraphysiana* Chiamolera, Cavichioli & Anderle, 2003, *Xenocoelidia* Kramer, 1959, *Chinchinota* Kramer, 1967 and *Chinaia* Bruner & Metcalf, 1934. These genera were recovered forming a monophyletic clade in the cladistic analysis of the Neocoelidiinae proposed by Marques-Costa & Cavichioli (2012) based on 85 morphological characters, but with low support (Bremer = 1).

*Takiyaella* gen nov. differs from the other mentioned genera by the forewing (Figs 1D, 7D) with two or three dark maculae on clavus, crossvein 's' missing; hind wing with veins  $R_{4+5}$  and  $M_{1+2}$  convergent preapically and fused to each other at apex, forming a single vein; male pygofer (Figs 5E, 8E) with a sclerotized and dentated ventral tooth on apical portion and caudal margin usually with ventral rounded lobe; valve (Figs 3G, 8G) without indication of separation with subgenital plates; subgenital plates (Figs 7G, 10F) fused to each other in the basal two-thirds; connective (Figs 3H, 7H) usually with stem reduced; style (Figs 1H, 7H) with preapical lobe moderately developed; and the aedeagus (Figs 5J, 7J, 8J) with one or two pairs of atrial processes. In addition, all species known for *Takiyaella* gen. nov. have distribution restricted to the Atlantic Rainforest biome (Fig. 13), unlike what occurs with the species of the other genera mentioned above, which mostly are distributed in the Amazon Rainforest biome, except for *Chinaia bidentata* Chiamolera & Cavichioli, 2002 that is found in the Atlantic Rainforest.

## Acknowledgments

C.C. Gonçalves is currently a post-doctoral fellow from Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ, proc. E-26/202.301/2019). A.C. Domahovski receives a doctoral fellowship from Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) (proc. 140815/2017-1).

## References

- Bruner S.C. & Metcalf Z.P. 1934. A new Bythoscopidae from Costa Rica. *Bulletin of the Brooklyn Entomological Society* 29: 120–124.
- Cavichioli R.R. & Takiya D.M. 2012. Description of a new species of *Wolfniana* and new records of *Rotigonalia* (Hemiptera: Cicadellidae: Cicadellinae) from the state of Amazonas, Brazil. *Zoologia* 29 (1): 85–88. <https://doi.org/10.1590/S1984-46702012000100011>
- Chiamolera L.B. & Cavichioli R.R. 2003. *Xenocoelidia* Kramer: descrição de uma espécie nova (Hemiptera, Auchenorrhyncha, Neocoelidiinae). *Revista Brasileira de Zoologia* 20 (2): 199–200. <https://doi.org/10.1590/S0101-81752003000200004>
- Chiamolera L.B. & Cavichioli R.R. 2005. Notas sobre *Coelidiana* Oman (Hemiptera, Cicadellidae, Neocoelidiinae) com descrição de três novas espécies do Brasil. *Revista Brasileira de Zoologia* 22 (2): 494–500. <https://doi.org/10.1590/S0101-81752005000200028>
- Coelho-Marques A.P. & Ale-Rocha R. 2016. Four new species of *Chinaia* Bruner & Metcalf (Hemiptera: Cicadellidae: Neocoelidiinae) from the Neotropical Region. *Zootaxa* 4189 (1): 145–155. <https://doi.org/10.11646/zootaxa.4189.1.7>
- Coelho-Marques A.P. & Ale-Rocha R. 2017. Description of a new neotropical species of *Xiqilliba* Kramer (Hemiptera: Cicadellidae: Neocoelidiinae). *Zootaxa* 4311 (3): 409–416. <https://doi.org/10.11646/zootaxa.4311.3.6>
- DeLong D.M. 1953. A synopsis of the tribe Neocoelidini in the Americas (Homoptera-Cicadellidae). *Lloydia* 16 (2): 93–131.
- Dietrich C.H. 2003. Some unusual Neotropical Neocoelidiinae with a redefinition of the subfamily (Hemiptera: Membracoidea: Cicadellidae). *Annals of the Entomological Society of America* 96 (6): 700–715. [https://doi.org/10.1603/0013-8746\(2003\)096\[0700:SUNNWA\]2.0.CO;2](https://doi.org/10.1603/0013-8746(2003)096[0700:SUNNWA]2.0.CO;2)
- Dietrich C.H. 2005. Keys to the families of Cicadomorpha and subfamilies and tribes of Cicadellidae (Hemiptera: Auchenorrhyncha). *Florida Entomologist* 88 (4): 502–517. [https://doi.org/10.1653/0015-4040\(2005\)88\[502:KTTFOC\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2005)88[502:KTTFOC]2.0.CO;2)

- Dietrich C.H., Allen J.M., Lemmon A.R., Lemmon E.M., Takiya D.M., Evangelista O., Walden K.K.O., Grady P.G.S. & Johnson K.P. 2017. Anchored hybrid enrichment-based phylogenomics of leafhoppers and treehoppers (Hemiptera: Cicadomorpha: Membracoidea). *Insect Systematics and Diversity* 1 (1): 57–72. <https://doi.org/10.1093/isd/ixx003>
- Gonçalves C.C. & Mejdalani G. 2017. Three new species of Peruvian *Nelidina* (Hemiptera: Cicadellidae: Neocoelidiinae) with key to males. *Zootaxa* 4365 (1): 85–93. <https://doi.org/10.11646/zootaxa.4365.1.6>
- Hamilton K.G.A. 1981. Morphology and evolution of the rhynchotan head (Insecta: Hemiptera, Homoptera). *Canadian Entomologist* 113 (11): 953–974. <https://doi.org/10.4039/Ent113953-11>
- Hill B.G. 1970. *Comparative Morphological Study of Selected Higher Categories of Leafhoppers (Homoptera: Cicadellidae)*. PhD thesis, North Carolina State University, Raleigh, USA.
- Knull D.J. 1942. The genus *Neocoelidia* in the United States (Homoptera: Cicadellidae). *American Midland Naturalist* 28 (3): 680–692. <https://doi.org/10.2307/2420898>
- Kramer J.P. 1964. A generic revision of the leafhopper subfamily Neocoelidiinae. (Homoptera: Cicadellidae). *Proceedings of the United States National Museum* 115 (3484): 259–287. <https://doi.org/10.5479/si.00963801.115-3484.259>
- Kramer J.P. 1967. New neotropical Neocoelidiinae with keys to the species of *Coelidiana*, *Xenocoelidiana*, and *Nelidina* (Homoptera: Cicadellidae). *Proceedings of the Entomological Society of Washington* 69 (1): 31–46.
- Maes P.J.M. & Godoy C. 1993. Catalogo de los Cicadellidae (Homoptera) de Nicaragua. *Revista Nicaraguense de Entomologia* 24: 5–34.
- Marques-Costa A.P. & Cavichioli R.R. 2012. Cladistic analysis of Neocoelidiinae (Hemiptera: Cicadellidae) with description of a new tribe. *Zootaxa* 3483: 1–28. <https://doi.org/10.11646/zootaxa.3483.1.1>
- Mejdalani G. 1993. Morfologia da cabeça de *Versigonalia ruficauda* (Walker, 1851), com notas sobre a terminologia (Homoptera, Cicadellidae, Cicadellinae). *Revista Brasileira de Entomologia* 37 (2): 279–288.
- Mejdalani G. 1998. Morfologia externa dos Cicadellinae (Homoptera, Cicadellidae): comparação entre *Versigonalia ruficauda* (Walker) (Cicadellini) e *Tretogonia cribrata* Melichar (Proconiini), com notas sobre outras espécies e análise da terminologia. *Revista Brasileira de Zoologia* 15 (2): 451–544. <https://doi.org/10.1590/S0101-81751998000200015>
- Nielson M.W. & Knight W.J. 2000. Distributional patterns and possible origin of leafhoppers. (Homoptera, Cicadellidae). *Revista Brasileira de Zoologia* 17 (1): 81–156. <https://doi.org/10.1590/S0101-81752000000100010>
- Oman P.W. 1949. The Nearctic leafhoppers (Homoptera: Cicadellidae). A generic classification and check list. *Memoirs of the Entomological Society of Washington* 3: 1–253.
- QGIS.org 2021. QGIS Geographic Information System. QGIS Association. Available from <http://www.qgis.org> [accessed 24 Feb. 2021].
- Rakitov R.A. 1997. On differentiation of cicadellid leg chaetotaxy (Homoptera: Auchenorrhyncha: Membracoidea). *Russian Entomological Journal* 6: 7–27.
- Young D.A. 1968. Taxonomic study of the Cicadellinae (Homoptera: Cicadellidae), Part 1, Proconiini. *Bulletin of the United States National Museum* 261: 1–287. <https://doi.org/10.5962/bhl.part.20869>

Young D.A. 1977. Taxonomic study of the Cicadellinae (Homoptera: Cicadellidae). Part 2. New World Cicadellini and the genus *Cicadella*. *Bulletin of North Carolina Agricultural Experiment Station* 239: 1–1135.

Zanol K.M.R. 1988. Morfologia de *Neophlepsius gracilis* (Osborn, 1923) (Homoptera, Cicadellidae, Deltocephalinae). *Revista Brasileira de Entomologia* 32 (1): 69–93.

*Manuscript received: 4 April 2021*

*Manuscript accepted: 27 August 2021*

*Published on: 18 October 2021*

*Topic editor: Nesrine Akkari*

*Section editor: Christopher Dietrich*

*Desk editor: Eva-Maria Levermann*

Printed versions of all papers are also deposited in the libraries of the institutes that are members of the *EJT* consortium: Muséum national d'histoire naturelle, Paris, France; Meise Botanic Garden, Belgium; Royal Museum for Central Africa, Tervuren, Belgium; Royal Belgian Institute of Natural Sciences, Brussels, Belgium; Natural History Museum of Denmark, Copenhagen, Denmark; Naturalis Biodiversity Center, Leiden, the Netherlands; Museo Nacional de Ciencias Naturales-CSIC, Madrid, Spain; Real Jardín Botánico de Madrid CSIC, Spain; Zoological Research Museum Alexander Koenig, Bonn, Germany; National Museum, Prague, Czech Republic.