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Research article

urn:lsid:zoobank.org:pub:CF16D797-18E1-45E4-84F5-164BD6D3C6FE

***Platygonia* Melichar, 1925 (Insecta: Hemiptera: Cicadellidae: Cicadellini): a new species from the Brazilian Amazon Rainforest, key to species of the genus, and notes on *P. undecimmaculata* (Fowler, 1899)**

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Abstract. A new species of the Neotropical genus *Platygonia* Melichar, 1925 is described and illustrated from the municipality of Ipixuna, State of Amazonas, Northern Brazil. *Platygonia nigra* sp. nov. can be distinguished from the other species of the genus by the following combination of features: (1) dark brown to black ground color of dorsum; (2) presence of a white to pale yellow spot at the distal portion of corium; (3) male pygofer with a conspicuous diagonal cleft; (4) connective Y-shaped, keeled, with the stem longer than the arms; and (5) aedeagus with an unpaired basiventral process directed anteriorly. This is the first record of the genus from the Brazilian Amazon Rainforest. Notes on *P. undecimmaculata* (Fowler, 1899), which is a taxon of uncertain taxonomic position, a key to the species of *Platygonia*, and a map showing their distribution are added.

Keywords. Cicadellinae, leafhopper, morphology, Neotropical Region, taxonomy.

Quintas V., Peclly N.H., Carvalho S.R. & Mejdalani G. 2022. *Platygonia* Melichar, 1925 (Insecta: Hemiptera: Cicadellidae: Cicadellini): a new species from the Brazilian Amazon Rainforest, key to species of the genus, and notes on *P. undecimmaculata* (Fowler, 1899). *European Journal of Taxonomy* 806: 177–186.
<https://doi.org/10.5852/ejt.2022.806.1715>

Introduction

Cicadellidae Latreille, 1825 (leafhoppers) is the largest family of the hemipteran suborder Auchenorrhyncha Duméril, 1806, comprising more than 2500 genera and about 21 300 species (Bartlett *et al.* 2018). According to Nielson & Knight (2000), leafhopper subfamilies are distributed in all zoogeographical regions of the world, with a greater diversity in the Neotropical, Afrotropical, and Oriental regions. Cicadellids feed on a wide variety of vascular plants, including grasses, herbaceous vegetation, shrubs, and trees (Bartlett *et al.* 2018). Many species are vectors of plant diseases and thus have agricultural importance.

The subfamily Cicadellinae Latreille, 1825 (sharpshooters) is especially rich in the Neotropical Region (Young 1968, 1977). According to Bartlett *et al.* (2018), it includes currently about 2300 species in ca 320 genera. The members of this subfamily are xylem-feeders (Young 1968; Redak *et al.* 2004) and their size varies from 3.4 to 22 mm (Mejdalani 1998). Certain species are vectors of plant diseases caused by bacteria (*Xylella fastidiosa* Wells *et al.*, 1987) and thus have economic importance (Redak *et al.* 2004). Currently, two tribes are recognized within the Cicadellinae, the New World Proconiini Dallas, 1870 and the cosmopolitan Cicadellini Latreille, 1825 (Young 1968, 1977, 1986; Mejdalani 1998). The latter comprises approximately 260 genera and 1900 species (Mejdalani 1998). Sharpshooters can be collected using sweeping nets, aspirators, light traps, and sometimes yellow plates; however, Malaise traps are perhaps the most effective method for collecting these insects.

The Neotropical Cicadellini genus *Platygonia* Melichar, 1925 (type species: *Tettigonia praestantior* Fowler, 1899) currently includes eight species (Wilson *et al.* 2009): *P. angrana* Young, 1977, *P. detecta* Young, 1977, *P. ignifera* (Walker, 1851), *P. infulata* Young, 1977, *P. praestantior* (Fowler, 1899), *P. spatulata* (Signoret, 1854), *P. undecimmaculata* (Fowler, 1899) – reinstated combination (see comments below), and *P. zea* (Distant, 1908). According to Young (1977), *Platygonia* occurs in Costa Rica, Panama, New Grenada, Colombia, Ecuador, Peru, and Southeastern Brazil. The genus, thus, shows a peculiar disjunct distribution.

Platygonia is apparently related to *Tipuana* Melichar, 1926, from which it differs, according to Young (1977), in having a carina at the transition from crown to face (exception: *P. angrana*), in the ocelli located before a transverse imaginary line located between the anterior eye angles, in the flattened or concave frons, in having sculpturing on pronotum and scutellum, in the truncate style apex, and in the absence of paraphyses. According to Mejdalani *et al.* (2014), *Cavichiana* Mejdalani *et al.*, 2014 shares similarities with *Platygonia* but can be easily distinguished from the latter by the absence of a carina at the transition from crown to face and by the presence of paraphyses.

In this paper, a new species of *Platygonia* is described and illustrated from the State of Amazonas, Northern Brazil. This is the first record of the genus from the Brazilian Amazon Rainforest. The taxonomic status of a Panamanian species of uncertain position, *P. undecimmaculata* (Fowler, 1899), is discussed. In addition, an updated key to the species of *Platygonia* and notes on their distribution are provided, including a map.

Material and methods

The specimens studied here belong to the Coleção Entomológica Prof. José Alfredo P. Dutra, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (DZRJ) and Coleção de Invertebrados, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (INPA). Techniques for preparation of male terminalia structures followed those of Oman (1949). Dissected parts were stored in small vials with glycerin, as suggested by Young & Beirne (1958). The morphological terminology adopted here followed mainly Young (1968, 1977, 1986), except for the head (Hamilton 1981; Mejdalani

1993, 1998). Photographs of the body, in dorsal and lateral views, were taken with a Leica M205 C stereo microscope and processed with LAS ver. 4.6 software. Composite images created from the in-focus areas of the original photographs were produced by CombineZP, a free software developed by Alan Hadley (<http://combinezp.software.informer.com>). Using the online tool SimpleMappr (Shorthouse 2010), we prepared a map to show the known distribution of *Platygonia*. In quotations of label data, a reversed virgule (\) separates lines on a label.

Results

Taxonomic account

Class Insecta Linnaeus, 1758
Order Hemiptera Linnaeus, 1758
Suborder Auchenorrhyncha Duméril, 1806
Family Cicadellidae Latreille, 1825
Subfamily Cicadellinae Latreille, 1825
Tribe Cicadellini Latreille, 1825

Genus *Platygonia* Melichar, 1925

Platygonia Melichar, 1925: 340. Type species: *Tettigonia praestantior* Fowler, 1899, by original designation.

Platygonia nigra sp. nov.

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Figs 1–6

Diagnosis

Ground color of dorsum dark brown to black with single white to pale yellow subtriangular spot at distal portion of corium (Figs 1–2); male pygofer with conspicuous diagonal cleft (Fig. 3); connective Y-shaped, keeled, with stem longer than arms (Fig. 5); aedeagus with unpaired basiventral process (Fig. 6).

Etymology

The specific epithet, ‘*nigra*’, refers to the mostly dark brown to black dorsum (Figs 1–2) of the new species.

Type material

Holotype

BRAZIL • ♂; “BRASIL: AM (State of Amazonas), Ipixuna, Rio \ Gregório, Com. [Comunidade] Lago Grande \ no Seringal do Recreio \ 07°10’06”S 070°49’06”W 145m \ 18-23.v.2011 Malaise Cavichioli, \ Gonçalves, Rafael, Takiya et al.”; INPA.

Paratype

BRAZIL • 1 ♂; same collection data as for holotype, except “17-23.v.2011 light trap \ Cavichioli, Gonçalves & Takiya”; DZRJ.

Type locality

Ipixuna, State of Amazonas, Northern Brazil.

Measurements

Total length: holotype (♂) 7.3 mm, paratype (♂) 7.4 mm.

Description

Male

COLORATION. Ground color of dorsum (head, pronotum, mesonotum, and forewings) dark brown to black (Figs 1–2). Anterior margin of crown light brown to brown. Distal portion of forewing corium with white to pale yellow subtriangular spot extending from costal margin to outer margin of outer anteapical cell. Face (Fig. 2) with frons, clypeus, lorum, maxillary plate, gena, labrum, and labium mostly pale yellow. Thorax and legs (Fig. 2) mostly pale yellow.

BODY. Dorsoventrally flattened.

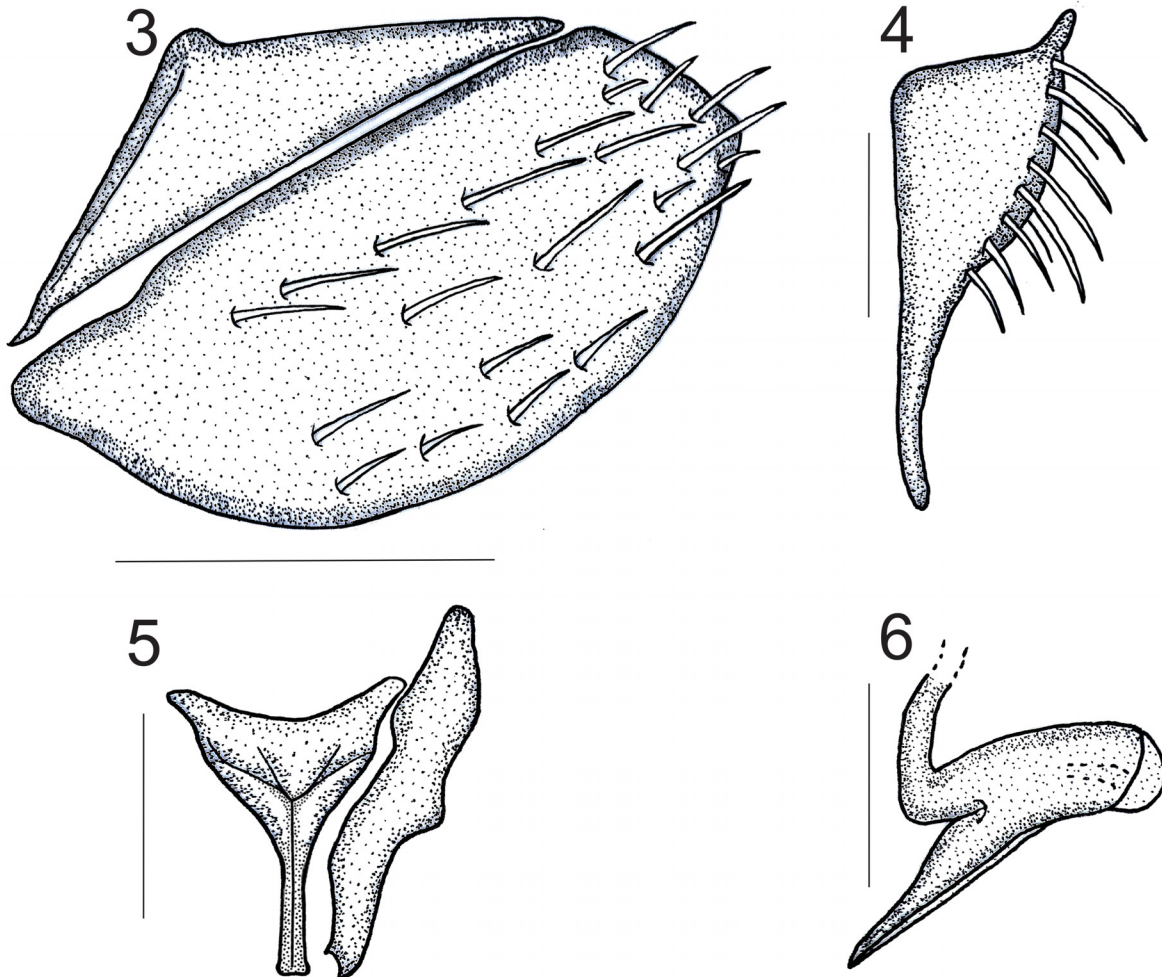
HEAD (Figs 1–2). In dorsal view, strongly produced anteriorly; median length of crown greater than interocular width and about $\frac{8}{10}$ transocular width; anterior margin narrowly rounded; with distinct carina at transition from crown to face; ocelli located slightly before transverse imaginary line between anterior eye angles, each ocellus slightly closer to median line of crown than to adjacent anterior eye angle; disk depressed from ocelli to apex; with inconspicuous median longitudinal fovea; frontogenal suture extending onto crown and attaining ocellus. Antennal ledge, in dorsal view, slightly protuberant; in lateral view, with anterior margin oblique. Face with disk of frons depressed medially; muscle impressions distinct. Clypeus with profile continuing contour of frons.



Figs 1–2. *Platygonia nigra* sp. nov., holotype, ♂ (INPA). 1. Body, dorsal view. 2. Body, lateral view. Scale bars = 2 mm.

THORAX (Figs 1–2). With pronotal width slightly smaller than transocular width of head; lateral margins of pronotum approximately parallel; posterior margin concave; dorsolateral carina complete, almost rectilinear, declivous anteriorly; disk transversely rugose, except on anterior third; mesonotum with scutellum not striate. Forewing (Figs 1–2) without distinct apical membranous area; apex convex; veins mostly distinct, not elevated; with four apical cells, base of fourth more proximal than base of third; without anteapical plexus of veins; texture coriaceous, without sculpturing. Hind wing with vein R_{2+3} incomplete. Hind leg with femoral setal formula 2:1:1; length of first tarsomere greater than combined length of two more distal tarsomeres, with two parallel rows of small setae on plantar surface.

TERMINALIA. With pygofer (Fig. 3), in lateral view, moderately produced posteriorly; disk with conspicuous diagonal cleft; posterior margin convex; macrosetae distributed on area of disk below diagonal cleft, except basally. Subgenital plate (Fig. 4), in ventral view, subtriangular; distal half strongly narrowed; not extending posteriorly as far as pygofer apex; with uniseriate macrosetae along outer margin; plates not fused to each other basally. Style (Fig. 5), in dorsal view, extending posteriorly approximately as far as apex of connective; without preapical lobe; apex truncate, with pair of tiny projections. Connective



Figs 3–6. *Platygonia nigra* sp. nov., holotype, ♂ (INPA). 3. Pygofer, lateral view. 4. Subgenital plate, ventral view. 5. Connective and style, dorsal view. 6. Aedeagus, lateral view. Scale bars: 3 = 0.5 mm; 4–6 = 0.25 mm.

(Fig. 5), in dorsal view, Y-shaped; arms poorly developed; stem longer than arms, distinctly keeled. Aedeagus (Fig. 6) symmetrical; shaft, in lateral view, short, with conspicuous unpaired basiventral process directed anterad; gonopore located apically. Paraphyses absent.

Female

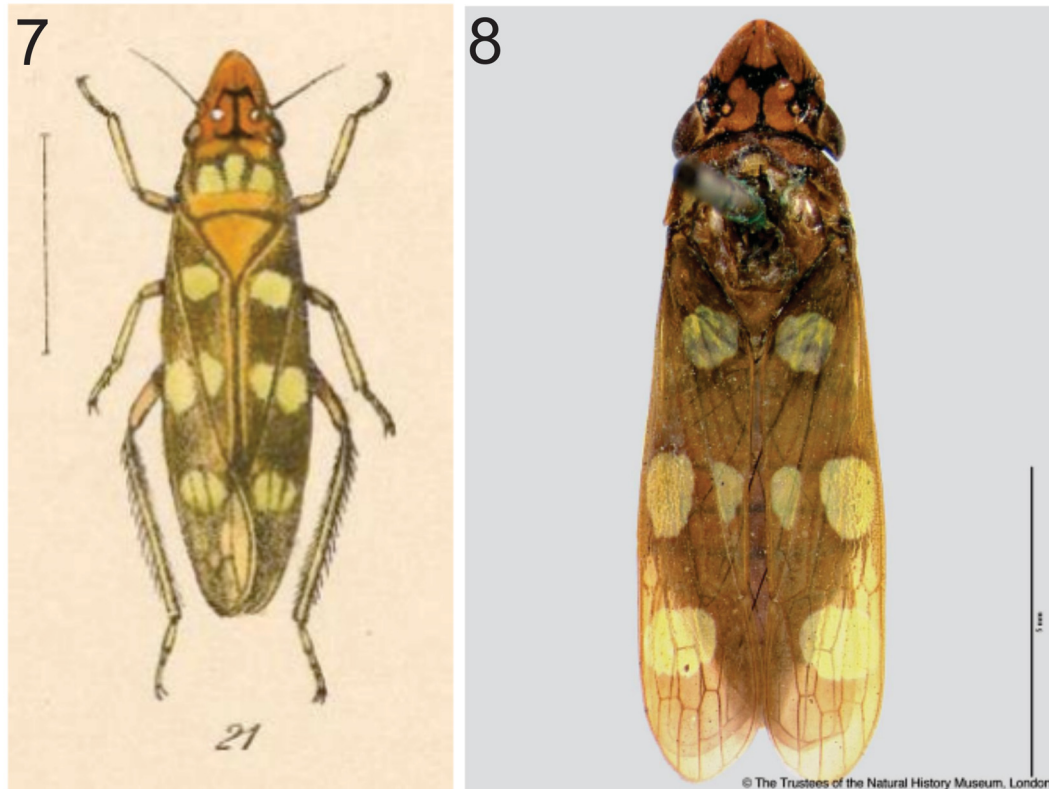
Unknown.

Remarks

Among the known species of *Platygonia*, the male terminalia of *P. nigra* sp. nov. (Figs 3–6) are most similar to those of *P. praestantior* and *P. spatulata*. However, the new taxon can be readily distinguished from the latter two species, as well as from the remaining ones of the genus, by the combination of features given above in the diagnosis. Its color pattern (Figs 1–2) is unique within the genus, thus allowing an easy identification.

Notes on *Platygonia undecimmaculata* (Fowler, 1899), reinstated combination

Tettigonia undecimmaculata was described by Fowler (1899) (Fig. 7) based on one female (holotype) (Fig. 8) from the Province of Chiriquí, Panama (Young 1965). Melichar (1925) transferred *T. undecimmaculata* to *Platygonia*. Young (1977: 1105) studied the holotype and stated that this species was “possibly correctly placed in *Platygonia* as Melichar decided.” Nevertheless, Young (1977) did not formally include *T. undecimmaculata* in *Platygonia*, preferring to treat it as a species of uncertain position. This action was followed by McKamey (2007: 343), who, however, misspelled the specific name (“*unidecimmaculata*”). The species reappeared as a member of *Platygonia* in Wilson *et al.*



Figs 7–8. *Platygonia undecimmaculata* (Fowler, 1899), holotype, ♀. **7.** Original illustration provided by Fowler (1899: tab. xvi, fig. 21). **8.** Body, in dorsal view, from Wilson *et al.* (2009).

(2009). Based on the triangular crown of the holotype, which is strongly produced anteriorly (Fig. 8), it appears to us that the inclusion of *T. undecimmaculata* in *Platygonia* might be correct. Accordingly, we have tentatively included the species in our key. Likewise, based on the color pattern of the holotype (see Wilson *et al.* 2009), which has no abdomen, hind wings, and metathorax (Young 1965), we have attempted to include *P. zea* (Ecuador) in the key; the latter species was not included in Young's (1977) key to *Platygonia* species.

Key to species of *Platygonia* (modified from Young 1977)

1. Each forewing with four large yellow spots (two on clavus and two on corium) (Figs 7–8)
 *P. undecimmaculata* (Fowler, 1899)
 – Forewing without above color pattern 2
2. Each forewing with two broad white to pale yellow complete transverse stripes, one at basal third and another just behind claval apex *P. zea* (Distant, 1908)
 – Forewing without above color pattern 3
3. Aedeagus, in lateral view, with a ventral process 5
 – Aedeagus, in lateral view, without a ventral process 4
4. Aedeagus, in lateral view, gradually tapered apically *P. infulata* Young, 1977
 – Aedeagus, in lateral view, obliquely truncate apically *P. ignifera* (Walker, 1851)
5. Crown-face transition without carina. Ventral process of aedeagus located apically (Southeastern Brazil) *P. angrana* Young, 1977
 – Crown-face transition with carina. Ventral process of aedeagus located on median third or more basally (Central America, Colombia, and Northern Brazil) 6
6. Pronotum with a large yellow spot; forewing with a large yellow spot extending from costal margin to median portion of clavus and a large orange spot at apical portion of corium, including anteapical cells *P. praestantior* (Fowler, 1899)
 – Without the above combination of color features 7
7. Disk of crown convex before ocelli *P. detecta* Young, 1977
 – Disk of crown concave or depressed before ocelli 8
8. Crown dark brown to black only at lateral margins *P. spatulata* (Signoret, 1854)
 – Crown almost entirely dark brown to black (Figs 1–2) *P. nigra* sp. nov.

Discussion

With the addition of *P. nigra* sp. nov., *Platygonia* now comprises nine species. Eight of them are distributed in southern Central America or northern South America. *Platygonia angrana* is the single species of the genus recorded from the Atlantic Rainforest of Southeastern Brazil (Fig. 9). The new taxon constitutes the first record of *Platygonia* from the Brazilian Amazon Rainforest and is the first species described for the genus after the detailed revision published by Young (1977).

The distribution of *P. angrana* is clearly disjunct from those of the other known species of the genus (Fig. 9). Furthermore, the head in this species has no carina at the transition from crown to face. As aforementioned, the presence of this carina is a diagnostic feature of *Platygonia* (Young 1977). Therefore, the assignment of *P. angrana* to *Platygonia* is doubtful and should be further investigated by means of morphological and molecular phylogenetic analyses.

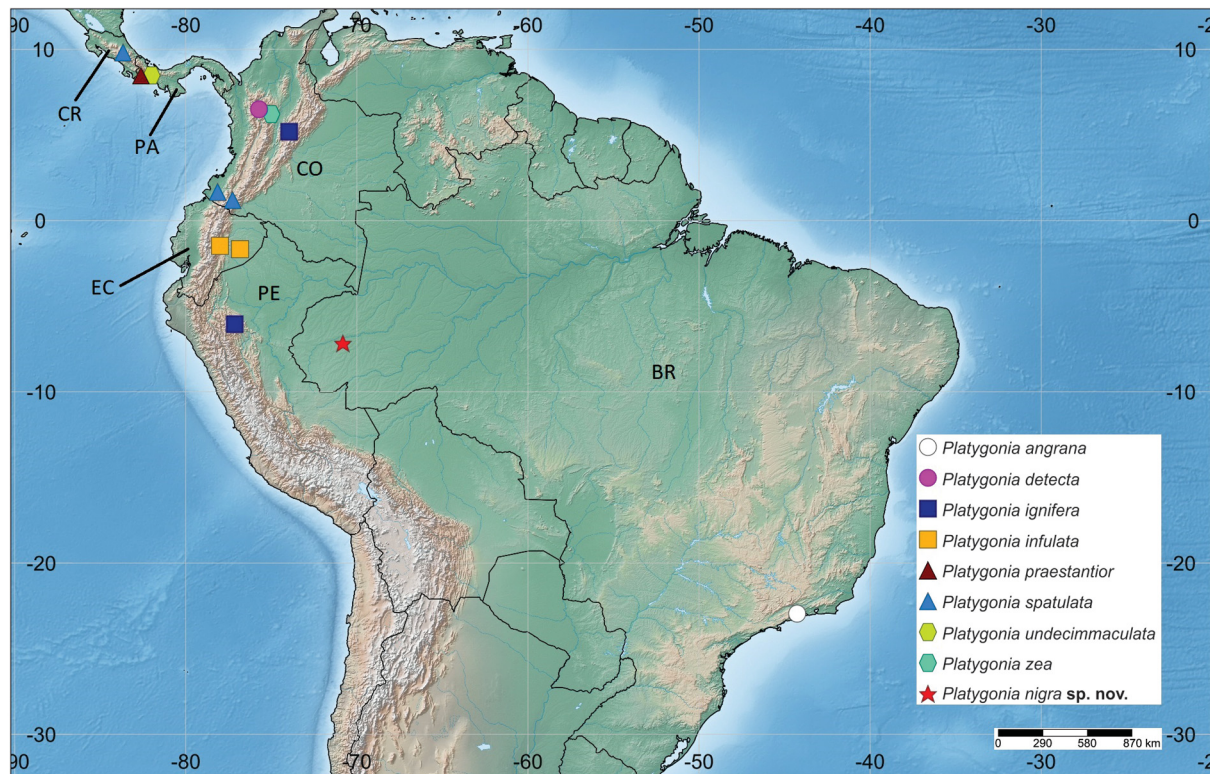


Fig. 9. Known distribution of species of *Platygonia* Melichar, 1925. Countries: BR = Brazil; CO = Colombia; CR = Costa Rica; EC = Ecuador; PA = Panama; PE = Peru.

This paper, along with other publications on the taxonomy of the tribes Cicadellini and Proconiini (e.g., Cavichioli & Mejdalani 2012; Silva *et al.* 2017, and Pecly *et al.* 2019), reveals that the fauna of the Cicadellinae from the Neotropical Region, especially that from the Amazon Rainforest, is still poorly known. The greater concentration of leafhopper taxonomists in Southeastern and Southern Brazil, in comparison with other regions of the country, is possibly an explanation for this problem, as well as the great difficulties for accessing various collection sites in the Amazon region. Studies of material in backlogs of scientific collections, as well as the conduction of field work in various parts of the Amazon region, will certainly result in the discovery of new interesting species and genera of the Cicadellinae and other leafhopper subfamilies.

Acknowledgments

Daniela Maeda Takiya (DZRJ) kindly made available for study the specimens of the new species. VQ receives a stipend from Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq; process 140625/2019-4) and NHP receives a stipend from Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES; process 88887.571619/2020-00) in connection with their D.Sc. studies at the Programa de Pós-graduação em Zoologia, Museu Nacional (UFRJ). SRC receives a PIBIC stipend from UFRJ. GM is a research productivity fellow from CNPq (process 303229/2018-7). This work was supported by Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ; process E-26/200.082/2019; Apoio Emergencial ao Museu Nacional). The manuscript benefited from useful comments provided by two anonymous reviewers.

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Manuscript received: 16 November 2021

Manuscript accepted: 28 January 2022

Published on: 31 March 2022

Topic editor: Tony Robillard

Section editor: Christopher H. Dietrich

Desk editor: Pepe Fernández

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