UNIVERSIDADE FEDERAL DO PARANÁ

LUÍSA ALASMAR

REVISÃO TAXONÔMICA DAS ESPÉCIES NEOTROPICAIS DO GÊNERO *CIMINIUS* METCALF & BRUNER (INSECTA: HEMIPTERA: CICADELLIDAE)

CURITIBA

2023

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Dissertação apresentada ao curso de Pós-Graduação em Entomologia, Setor de Ciências Biológicas, Universidade Federal do Paraná, como requisito parcial à obtenção do título de Mestre em Ciências Biológicas (Entomologia).

Orientador: Prof. Dr. Rodney Ramiro Cavichioli

Coorientador: Dr. Alexandre Cruz Domahovski

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Os membros da Banca Examinadora designada pelo Colegiado do Programa de Pós-Graduação CIÊNCIAS BIOLÓGICAS (ENTOMOLOGIA) da Universidade Federal do Paraná foram convocados para realizar a arguição da dissertação de Mestrado de **LUÍSA ALASMAR** intitulada: **Revisão Taxônomica das Espécies Neotropicais do Gênero Ciminius Metcalf & Bruner (Insecta: Hemiptera: Cicadellidae)**, sob orientação do Prof. Dr. RODNEY RAMIRO CAVICHIOLI, que após terem inquirido a aluna e realizada a avaliação do trabalho, são de parecer pela sua APROVAÇÃO no rito de defesa.

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RESUMO

Ciminius Metcalf & Bruner, 1936 é composto por seis espécies válidas, com três delas ocorrendo na região Neártica e quatro na região Neotropical. Apesar de ser um gênero abundantemente representado em coletas de varredura em gramíneas, o seu último trabalho taxonômico foi realizado em 1977, por D. A. Young, onde há a descrição de uma nova espécie e ilustrações e notas sobre as espécies válidas até o momento. No presente trabalho, a análise filogenética das espécies neotropicais baseada em dados morfológicos é providenciada. Com o intuito de testar a monofilia do gênero, este que possui características muito conservadas entre as espécies, foram incluídos vários representantes do Grupo Genérico *Cicadella* (*sensu* Young), por possuírem maior semelhança com *Ciminius* em diversos aspectos da genitália, tanto feminina quanto masculina. Como resultado, *Ciminius* foi recuperado, com alto suporte, como um grupo monofilético. A partir de estudos morfológicos minuciosos, descreveu-se três novas espécies para o gênero. Adicionalmente, os estágios imaturos de *Ciminius* sp. são descritos pela primeira vez. Com a utilização de dados geográficos das etiquetas de procedência, obteve-se um mapa de ocorrência das espécies de *Ciminius*, onde sua distribuição foi discutida. Decorrente das coletas realizadas para obter-se material para este estudo, foi encontrada uma nova espécie com características similares a *Ciminius,* mas que ao mesmo tempo se difere em vários aspectos morfológicos e que foi recuperado, com alto suporte, como grupo irmão de *Ciminius*, sendo então aqui descrita como um gênero novo. Além disso, as coletas realizadas permitiram um estudo amplo de espécimes, onde foram observados casos de parasitismo e fêmeas com submacropteria, uma condição incomum para a tribo Cicadellini.

Palavras-chave: Auchenorrhyncha; Cicadellini; filogenia; taxonomia; novas espécies; novo gênero.

ABSTRACT

Ciminius Metcalf & Bruner, 1936 consists of six valid species, three occurring in the Nearctic region and four in the Neotropical region. Despite being abundantly represented in sweep net collections on grasses, the last taxonomic work on this genus was conducted in 1977 by D. A. Young, where a new species was described, and illustrations and notes on the valid species up to that point were provided. In the present study, a phylogenetic analysis based on morphological data was provided. In order to test the monophyly of the genus, which has highly conserved characteristics among species, several representatives of the *Cicadella* Generic Group (*sensu* Young) were included, as they bear greater resemblance to *Ciminius* in various aspects of both female and male genitalia. As a result, *Ciminius* was recovered with strong support as a monophyletic group. Through detailed morphological studies, three new species were described for the genus. Additionally, the immature stages of *Ciminius* sp. were described for the first time. By utilizing geographic data from the labels of origin, an occurrence map of *Ciminius* species was created, and their distribution was discussed. During the collections carried out to obtain material for this study, a new species was found with similar characteristics to *Ciminius*, but in the same time differs in several morphological aspects and was strongly supported as the sister group to *Ciminius*, being here described as a new genus. Furthermore, the collections allowed for a comprehensive study of specimens, revealing cases of parasitism and females with submacropterous wings, an unusual condition for the tribe Cicadellini.

Keywords: Auchenorrhyncha; Cicadellini; phylogeny; taxonomy; new species; new genus.

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INTRODUÇÃO GERAL

Cicadellidae é uma família pertencente à superfamília Membracoidea, subordem Auchenorrhyncha e ordem Hemiptera. É composta por insetos fitófagos, que se alimentam tanto da seiva de xilema quanto de floema. Popularmente chamados de cigarrinhas, possuem tamanho e coloração variados, muitas vezes chamativos, e são distribuídos mundialmente. É a família mais diversa da ordem Hemiptera, com cerca de 19.500 espécies descritas, tendo sua maior diversidade na Região Neotropical (Wilson et al., 2009).

Dentro da família Cicadellidae, está a subfamília Cicadellinae, cujos representantes são indivíduos que se alimentam exclusivamente da seiva do xilema. Este recurso é considerado difícil de ser obtido, além de considerado pobre em nutrientes. Com isso, em Cicadellinae a fronte é bem entumecida devido a inserção dos músculos do cibório, órgão responsável pelo bombeamento da seiva do xilema, a qual tem pressão negativa (Hamilton, 1981).

Cicadellinae é dividido em duas tribos: Cicadellini, ocorrendo em todas as regiões biogeográficas e Proconiini, exclusivamente Neotropical (Young, 1968). Devido a este fato, a diversidade da primeira é consideravelmente superior à da segunda (Mejdalani, 1998). Atualmente a tribo Cicadellini possui mais de 1.200 espécies distribuídas em cerca de 170 gêneros para o Novo Mundo (Mejdalani & Cavichioli, 2013). Desses gêneros, 64 foram redefinidos e 91 descritos por Young, em sua monografia de 1977. Desde então, 19 novos gêneros foram propostos para a tribo pelos autores Cavichioli (1996, 1998, 2000a, b, 2003, 2008, 2010), Cavichioli & Takiya (2012a), Domahovski et al. (2023), Hamilton (1985), Mejdalani (1994), Mejdalani & Cavichioli (2013), Mejdalani et al. (2014), Nielson & Godoy (1995), Takiya et al. (2001), Takiya et al. (2003), Takiya & Cavichioli (2005), Freytag (2007), sendo esse último, dois gêneros exclusivos da região neártica (Mejdalani & Cavichioli, 2013, Mejdalani et al., 2014).

A maior concentração dessa diversidade dá-se na região Neotropical, devido a sua grande riqueza em biomas únicos e relativamente abundantes (Dietrich & Rakitov, 2002). A possível relação entre a região Neotropical e a diversidade da tribo Cicadellini foi levantada por Young (1977) quando este cita que a morfologia do grupo sugere uma rápida evolução e radiação, além de não apresentar muitas descontinuidades em relação a características morfológicas quando comparadas com a tribo Proconiini.

A tribo Cicadellini pode ser distinguida de Proconiini e de dos demais grupos de Cicadellidae por um conjunto de nove caracteres: 1) ocelos localizados na coroa, quase sempre mais proximal da margem posterior do que do ápice ou da margem anterolateral; 2) suturas frontogenais quase sempre se estendendo até a coroa, atingindo ou não os ocelos; 3) lobos antenais usualmente não fortemente protuberantes em vista dorsal; 4) face usualmente inchada e sem pubescência; 5) proepisterno exposto 6) asas anteriores com a célula apical interna paralela ao axis longo da asa; 7) pernas posteriores, em posição de repouso, com a articulação fêmur-tíbia quase sempre atingindo a lateral dos lobos pronotais; 8) tíbia posterior usualmente achatada lateralmente e com quatro fileiras regulares de macrosetas; 9) pigóforo do macho e/ou placas subgenitais quase sempre com macrosetas e/ou microsetas distribuídas de forma não uniforme (Young, 1968, Takiya & Cavichioli, 2005, Mejdalani & Cavichioli, 2013).

Em seu trabalho, Young (1977) organizou a tribo Cicadellini em grupos subjetivos (Generic groups), onde afirma não haver relação com a filogenia. No entanto, esses agrupamentos são utilizados até hoje, tanto por apresentarem características morfológicas consistentes, como pela facilidade de associação entre gênero e seu grupo pertencente (Defea & Paradell, 2017, Takiya & Mejdalani, 2004, Mauro-Barr & Carvalho 2008, Cavichioli et al., 2017). No decorrer dos anos, os autores prosseguem fazendo avanços para que a delimitação a nível de gênero seja cada vez mais robusta. A partir do trabalho de Mejdalani (1998), as estruturas das fêmeas, principalmente na segunda válvula, passam a ser utilizadas com maior riqueza de detalhes na taxonomia, tanto em espécies quanto comparativamente entre os gêneros. Além disso, estudos de filogenia, utilizando dados morfológicos, e recentemente dados moleculares, propõem um melhor entendimento geral sobre a relação entre as espécies e a delimitação de gênero.

Nesse trabalho, é feita a revisão taxonômica das espécies neotropicais do gênero *Ciminius* Metcalf & Bruner 1936, um gênero comumente encontrado em gramíneas, e cuho último estudo taxonômico foi realizado por Young, no ano de 1977, com a redescrição de espécies e a descrição de uma espécie nova ocorrente no Brasil. Ciminius possuem sete espécies, dessas, quatro são ocorrentes na região Neártica e três na região Neotropical. São cigarrinhas diminutas, com o aspecto morfológico externo muito similar entre as espécies, sendo assim, uma revisão taxonômica, com redescrições e imagens atualizadas das espécies neotropicais é providenciada. Uma análise filogenética a partir de caracteres morfológicos foi feita, a fim de testar a monofilia do gênero, utilizando as espécies neotropicais. Descrição dos cinco ínstares ninfais (*Ciminius* sp.) e três

espécies novas do estado do Paraná, são fornecidos, assim como um mapa de ocorrência para as espécies e notas de parasitismo e submacropteria. O Capítulo I dessa dissertação está redigido em inglês, sob as normas de publicação da revista Arthropod Systematics & Phylogeny, na qual o manuscrito resultante será submetido.

OBJETIVOS

Revisar as espécies neotropicais válidas do gênero *Ciminius*.

Fazer redescrições e novas ilustrações para as espécies.

Descrever as espécies novas.

Propor uma nova chave dicotômica para as espécies neotropicais.

Fazer uma análise filogenética baseada em dados morfológicos e testar a monofilia de *Ciminius*.

Discutir os aspectos morfológicos, biológicos e ecológicos do gênero, com o intuito de enriquecer integralmente o seu conhecimento.

Capítulo 1 – Taxonomic revision and morphological phylogeny of the Neotropical *Ciminius* Metcalf & Bruner, 1936 (Insecta, Hemiptera, Cicadellidae)

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Abstract

In a morphological based analysis using implied weighting for 20 taxa and 56 characters, we provided a phylogeny for the Neotropical *Ciminius*. The genus was recovered as monophyletic with a high support. Herein, we provided a taxonomic revision to genus,with description of three new species, increasing the diversity of *Ciminius* from seven to ten species: the Neotropical *C. albolineatus*, *C. callosa*, *C. platensis*, *C. yana*, *Ciminus* sp. nov. A, *Ciminus* sp. nov. B, *Ciminus* sp. nov. C, and the Nearctic *C. hartii*, *C. sidanus*, and *C. taosus*. A new monotypic genus, recovered as sister to *Ciminius* also is described. *Tylozygus* Fieber, new genus A, and *Ciminius* were recovered forming a clade here nominated as Articulate Stem Clade, due to its diagnostic feature amongst all Cicadellini. We describe all the immature stages of *Ciminius* sp. and provide a key to males of the Neotropical *Ciminius*, an occurrence map and notes of parasitism, and submacroptery. We discussed the *Ciminius* relationships according to our analysis, the genus distribution in Brazil, and the species *C. callosa.*

Keywords

Auchenorrhyncha; Cicadellini; Neotropical region; new taxa; phylogeny; sharpshooters.

1.Introduction

The genus *Ciminius* was erected by Metcalf & Bruner in 1936 to accommodate the species *Tettigonia hartii,* Ball 1901, recorded from Cuba and United States. DeLong and Knull (1946) transferred *Cicadella taosa* Ball, 1936 and *Cicadella sidana* Ball, 1936 to *Ciminius*. Oman (1949) described and illustrated for the first time the male genitalia for the genus. Young (1977) transferred the species *Cicadella callosa* Osborn, 1926, *Tettigonia albolineata* Taschenberg, 1884 and *Acocephalus dubius* Berg, 1879 to *Ciminius* and described a new species, *Ciminius yana* Young, 1977, based on specimens from Mato Grosso State, Brazil. Also, a key to males, illustrations of male and female genitalia, venation of fore and hind wings were provided. Although, Young's work (1977) brought some questions, as the similarity of the *C. callosa* holotype with the specimens of *C. platensis*, and the assemblance in the male genitalia characters between *C. hartii*, *C. taosus* and *C. sidanus*, except for some variations in the aedeagal processes. *Ciminius* is composed of robust rather small sharpshooters, with pale yellow, brown, or black coloration, that are abundant in grassland fields. According to Young (1977) this genus is related to *Tylozygus* but can be differentiated from them and all the other Cicadellini genus by the combination of two characters: (1) forewings with only two anteapical cells, the outer one opened basally, and (2) stem of connective occurring as a separate sclerite in male genitalia. Until the present moment, there are seven valid species, which *C. hartii*, *C. taosus* and *C. sidanus* have a Nearctic distribution and *C. albolineatus*, *C. callosa*, *C. platensis* and *C. yana* have a Neotropical distribution, all the last ones registered for Brazil.

Although *Ciminius* specimens are frequently collected in studies of *citrus variegated chlorosis* (CVC), and Cicadellini representatives considered as a possible vector of *Xylella fastidiosa* (Wells et al., 1987), there is no confirmation that they can cause indirect damage to citrus crops (Remes Lenicov et al. 1999; Redak et al. 2004; Remes Lenicov et al. 2006; Galdeano et al. 2009). The most recent works in the genus are records of specimen's association with crops of *Citrus sinensis* (Remes Lenicov et al. 1999), rice, cotton, and corn (Remes Lenicov et al. 1985), garlic (Galdeano et al. 2009), sorgum (Remes Lenicov et al. 2006) and *Vicia villosa* (Paradell et al. 2014). Also, there are records of predation of *C. hartii* by *Bembecinus godmani* Cameron, 1890 (Hymenoptera:

Sphecidae) (Krombein & Willink 1950) and records of parasitism of *C. platensis* eggs by *Anagrus breviphragma* Soyka, 1956 and *Gonatocerus virlai* Triapitsyn, Logarzo & de León, 2007 (Hymenoptera: Mymaridae) (Albarracin et al. 2009; Triapitsyn et al. 2010).

Despite the abundance of *Ciminius* specimens in grasses, the last taxonomic study was realized in 1977. The strong similarity between the species of the genus and the occurrence of intraspecific variations, both in the morphology of the male genitalia and in the coloration, suggest the need for a detailed study of the group. In this present work, we proposed a revision of the Neotropical species and a phylogenetic analysis based in morphology, described three new Brazilian species and the immature stages of *Ciminius* sp., and redescribed the Neotropical valid species. A discussion involving *C. callosa* is provided and we describe a new Brazilian genus, sister to *Ciminius*. In addition, notes of parasitism and submacroptery are reported, an occurrence map and a key to Neotropical *Ciminius* males are provided for the enrichment of the genus knowledge.

2.Material and methods

2.1 Collection, material examined and taxon sampling.

546 adult specimens of *Ciminius* were examined (Table 1) and deposited at the Coleção Entomológica Pe. Jesus Santiago Moure, Universidade Federal do Paraná, Curitiba, Brazil (DZUP). Images of holotype of *C. callosa* were provided from the Carneage Museum (CMNH). Additional material of nymphs and adults, provided by field collections realized between the years of 2021 and 2023, are stored in falcon tubes with absolute alcohol, each with proper precedence label. The field collections were made using a sweeping net in grasses around the Universidade Federal do Paraná, nearly to the Setor de Ciências Biológicas, in Curitiba, Parque Estadual de Vila Velha, in Ponta Grossa, both in Paraná State, and in Marília, São Paulo State, Brazil. The living specimens were extracted from the samples using a home-made photoecletor and fixed directly in alcohol.

Within the four Neotropical species currently described for *Ciminius*, three were included in the phylogenetic analysis, except for *C. callosa*, known by the female holotype, and three additional new species from Brazil (Table 1). The twelve species compounding the outgroup were chosen by presenting characters that assembles to that of *Ciminius*. The species of the genera *Chlorogonalia* Young, 1977, *Syncharina* Young, 1977, *Plesiommata* Provancher, 1889, *Cicadella* Latreille, 1817

and *Tylozygus* Fieber, 1866 belongs to the *Cicadella* generic group (*sensu* Young 1977), to which *Ciminius* belongs. The two species of *Rotigonalia* Young, 1977 are part of the *Juliaca* generic group (*sensu* Young 1977) and the two species of *Segonalia* Young, 1977 do not belong to any group. Also, a representative of the tribe Proconiini, phylogenetically distant from the ingroup, and sister of Cicadellini, is included to root the trees.

TABLE 1– Specimens included in the phylogenetic analysis. Number of analyzed specimens, sex, and type material are provided for each taxon. PT = paratype, HT = holotype, * = specimens studied by photography.

Taxon	**Specimens**		**Type**	
	♂	♀	♂	♀
Tapajosa ocellata Melichar	1	1	-	-
Cicadella viridis Linneaus	1	1	-	-
Chlorogonalia coeruleovittata (Signoret)	1	1	-	-
Segonalia steinbachi Young	1	1	-	-
Segonalia machadoi Cavichioli & Takyia	-	-	1 (PT)	1 (PT)
Rotigonalia larissae Cavichioli	-	-	1 (PT)	1 (PT)
Rotigonalia olivacea Cavichioli	-	-	1 (PT)	1 (PT)
Plesiommata corniculata Young	1	1	-	-
Plesiommata molicella Fowler	1	1	-	-
Syncharina argentina (Berg)	1	1	-	-
Syncharina punctatissima (Signoret)	1	1	-	-
Tylozygus fasciatus (Walker)	1	1	-	-
Tylozygus geometricus (Signoret)	1	1	-	-
New Genus A sp. nov. D	-	-	1 (HT)	-
Ciminius albolineatus (Taschenberg)	1	1	-	-
Ciminius platensis (Berg)	1	1	-	-
Ciminius yana Young	12	6	-	1(HT)*
Ciminius sp. nov. A	-	-	1 (HT)	1 (PT)
Ciminius sp. nov. B	-	-	1 (HT)	1 (PT)
Ciminius sp. nov C	-	-	1 (HT)	1(PT)

2.2 Terminology, morphological study, illustration, and label data

For taxa descriptions and redescriptions, the terminology adopted follows mainly Young (1977), except for head features, which follows Hamilton (1981) and wings morphology follows Zahniser (2021). For female genitalia, the terminology follows Nielson (1965), with the use of the term 'gonoplac' as suggested in Mejdalani (1998). The structure and terminology of the immatures descriptions follows Marucci et al. (2000).

For genitalia dissections, the technique follows Oman (1949), with modifications of Cavichioli & Takyia (2012b), for both males and females. The structures were analyzed on a concave slide, covered in glycerin, with a Wild Heerbrugg M5 stereomicroscope. Images of the habits of both immatures and adults and male genitalia were taken by a Leica MZ12.5 stereomicroscope with a SCMOS 14000KPA camera attached. For the comparative immatures photo, the specimens were placed on a petri dish with a thin layer of agar to stabilize the specimens and covered with alcohol. The habitus images were stacked with Combine Z5 software and edited with Adobe Photoshop CS6. Male genitalia plates were drawn with the software Adobe Illustrator CS6. For the female genitalia plates, the gonoplac and valvulae I and II were detached and temporarily mounted in a slide, immersed in glycerin, and the images were taken by a Nikon microscope, with a SCMOS 05100KPB camera attached. The images were merged and edited with the Adobe Photoshop CS6 software. The genitalia structures were stored in a small vial with glycerin, attached to the corresponding adult pin, as suggested by Young & Beirne (1958). The wings were slightly clarified with KOH 10%, in a water bath, for about one minute after boiling. The structure was mounted in a temporary slide covered with glycerin and the images were taken by a Nikon microscope, with a SCMOS 05100KPB camera attached.

The verbatim label data are transcribed between quotation marks, with a backslash (\) indicating line breaks and brackets ([ ]) to supplement abbreviated information.

2.3 Phylogenetic analysis

The characters coding was based on direct observations of adult specimens of males and females, coded as binary or multistate, with the homology proposition as suggested by Patterson (1988). The characters were scored as hyphen (-) when inapplicable and their descriptions and states follows Sereno (2007). The data matrix was constructed in Mesquite v2.75 (Maddison & Maddison 2011). The software TNT v1.5 no tax limit was used to carry out the parsimony analysis (Goloboff

& Catalano 2016), under equal weights (EW), using Traditional search, with the Tree-Bissection-Reconnection (TBR) algorithm (random seed = 0, replications = 10000, trees saved per replication = 10). The implied weights (IW) was used, with k value = 3 (default), to discuss our results, in the purpose of downweighting the characters according to their homoplasy degree (Goloboff 1993). All characters were treated as nonadditive (Fitch 1971). To calculate the support of our tree we used the symmetric resampling (SR) with 5000 replications (Goloboff et al. 2003) in TNT. The unambiguous characters were shown on our tree using the software WinClada 1.00.08 (Nixon 2002).

2.4 Occurrence map

The occurrence map was performed with the online tool Simple Mappr (available at https://www.simplemappr.net/) with quoted data based in Young (1977) and McKamey (2007), original descriptions (Berg 1879; Taschenberg 1884; Ball 1901; 1936; Metcalf & Bruner 1936; Young 1977) and DZUP deposited material labels.

3. Results

3.1 Taxonomy

3.1.1 *Ciminius* Metcalf & Bruner, 1936

Figs 1-20, 29, 30B, 32E-F, 35, 36.

Type species. *Tettigonia hartii* Ball, 1901: 61

Diagnosis. Small sharpshooters, from 3.3 to 5.0 mm. Overall coloration (Figs 1A-C, 2, 4A-C, 7A-C) pale-yellow, brown, or black, rarely reddish, with pair of blackened rounded macula behind ocelli. Forewing (Fig 29A) with only two anteapical cells, the outer one open basally, with anteapical plexus of veins. Male genitalia with the stem of connective (Figs 1I, 4I, 7I) occurring as a separate sclerite, articulated with connective arms anteriorly and with paraphysis arms posteriorly. Aedeagus symmetrical (Figs 1G-H, 4G-H, 7G-H); with shaft protuberant; ventral margin often bearing serrated processes; apex rounded, commonly expanded, forming a hood-like

structure. Paraphysis (Figs 1I-J, 4I-J, 7I-J) ramus long and slender, articulated with a pair of parallel arms.

Description. Head and thorax (Figs 1A, 2A, C, E, G, 4A). Crown, in dorsal view, from slightly to moderated produced; anterior margin from broadly rounded to subtriangular, without concavities between ocelli; surface with texture slightly punctate, without fovea between eyes and ocelli, without carina on transition from crown to face. Median length of crown from 1/6 to 1/4 of transocular width, and from 2/7 to 1/2 of intraocular width. Ocelli located slightly before or aligned to imaginary line between anterior eye angles, slightly closer to adjacent eye angle than to median line. Frontogenal suture extending to crown, attaining ocelli. Antennal ledge, in dorsal view, not protuberant; in lateral view, slightly curved and oblique, not carinated. Frons, in lateral view, slightly oblique, not inflated medially; in frontal view, texture slightly punctate, muscular impressions distinct; epistomal suture complete. Clypeus, in frontal view, with apical margin rounded; in lateral view, continuing frons contour, without pubescence; in dorsal view, with width equivalent or slightly greater than transocular width, texture slightly rugose, without pubescence; in lateral view, dorsopleural carina complete or incomplete; in dorsal view, slightly rugose transversely anterior to transversal sulcus and smooth posteriorly. Forewing (Figs 1A-B, 2A, C, E, G, 4A-B, 27A-B) opaque, without sculpting; membrane indistinct; veins distinct and elevated; with four apical cells, fourth presenting a plexus of additional veins, with basis slightly more proximal to clavus apex; with only two anteapical cells, of which the outer one is open basally; appendix narrow and extending almost to third apical cell. Hind leg with femoral setal formula 2:1:0; first tarsomere shorter than combined length of two more distal tarsomeres, with two parallel longitudinal rows of small setae on plantar surface. Abdomen (Fig 30B), in ventral view, with a pair of small triangular apodemes.

Male terminalia. Pygofer (Fig 1D, 4D, 7D), in lateral view, moderately produced, without processes; posterior margin from broadly to narrowly rounded; macrosetae distributed on entire disk; microsetae along posterior margin. Valve (Fig 1E, 4E, 7E), in ventral view, slender, anterior and posterior margins parallel; lateral margins rounded. Subgenital plate (Fig 1D-E, 4D-E, 7D-E), in ventral view, not fused to its counterpart, triangular, narrowing gradually towards apex; outer margin with uniseriate row of macrosetae and microsetae on apical third; in lateral view, attaining

or slightly surpassing half of pygofer. Style (Fig 1F, 4F, 7F), in dorsal view, extending posteriorly much as far as connective apex; with or without preapical lobe, apex distinctly sclerotized and truncate. Connective (Fig 1F, 4F, 7F), in dorsal view, u-shaped; arms as long as wide. Stem of connective (Fig 1I, 4I, 7I,) occurring as a separate sclerite, connecting anteriorly to connective and posteriorly to paraphysis arms; long and keeled medially, not well sclerotized. Aedeagus (1G-H, 4G-H, 7G-H,), symmetrical; directed posteroventrally; shaft from slightly protuberant to strongly protuberant, forming lobate process on dorsal margin; ventral margin bearing or not serrated processes preapically, medially or along entire margin; apex rounded, often expanded forming a hood-like structure; in caudoventral view, often compressed, gonopore apical. Paraphysis (1I-J, 4I-J, 7I-J), in lateral view, with pair of symmetrical short arms directed dorsally; articulated with a long slender ramus directed posterodorsally or posteroventrally; curved ventrally or rectilinear; bearing or not a conspicuously preapical constriction on ventral margin; apex acute or subacute.

Female terminalia. Sternite VII (Fig 3A-C, 5A-C, 9A-C), in ventral view**,** from 1.6 to 2.0x wider than long; lateral margins parallel; posterior margin with a median lobe from nearly indistinct to strongly distinctly. Pygofer (Fig 3B, 5B, 9B), in lateral view, moderately produced, posterior margin broadly rounded; macrosetae distributed along ventral and posterior margins. First valvifer (Fig 3D, 5D, 9D) wide, broadly rounded. Valvula I (Fig 3D-E, 5D-E, 9D-E) broad, almost straight, with median third slightly expanded; dorsal sculpted area strigate, extending from basal portion to apex; ventral sculpted area restricted to apical portion, scale-like. Valvula II (Fig 3F-H, 5F-H, 9F-H) expanded dorsally beyond basal curvature; dorsal and ventral margins rectilinear; blade with 12-18 continuous triangular or subtriangular teeth, with or without distinct gap on anterior margin of teeth and each teeth receiving one to three ducts; denticles distributed along teeth and on ventral and dorsal margins of apical portion; without preapical prominence. Gonoplac (Fig 3I-J, 5I-J, 9I-J) narrow; expanded dorsally on apical half; outer surface with tiny denticuli on apical portion, apex rounded.

Remarks. *Ciminius* specimens have resemblances in male genitalia to *New genus A* and *Tylozygus* but they can be differentiated from them by the diagnostic features above. Also, *Ciminius* can be promptly differentiated from all the *Cicadellini* in grasses by the forewing presenting only two anteapical cells, with the outer one opened basally and with a plexus of veins anteapically.

Amongst all the New World Cicadellini, only *Ciminius* and *Hadria* Metcalf & Bruner, 1936 presents two anteapical cells, but in the latter, both are opened basally, in addition to their bright colorfully aspect and their distribution, restricted to Cuba, Haiti and Dominican Republic.

Species of *Ciminius* Metcalf & Bruner

(Distribution based on Young (1977), Mckamey (2007), and deposited specimens at DZUP; an asterisk indicates species known only from a female holotype).

C. albolineatus (Taschenberg, 1884). Argentina, Brazil (Goiás, Mato Grosso, Paraná, Rondônia, Roraima), Bolivia, Cuba, El Salvador, French Guiana, Isle of Pines, Panama, Venezuela.
C. callosa (Osborn, 1926)*. Bolivia.
C. hartii (Ball, 1901). Cuba, United States (Florida, Georgia, Illinois, Indiana, Kansas, Louisiana, Mississipi, Missouri, New Mexico, Ohio, Oklahoma, Pennsylvania, Tennessee, Texas, Virginia), México.
C. platensis (Berg, 1879). Argentina, Brazil (Bahia, Ceará, Espírito Santo, Mato Grosso do Sul, Minas Gerais, Paraná, Pernambuco, Piauí, Rio Grande do Sul, São Paulo), Paraguai, Peru, Venezuela.
C. sidanus (Ball, 1936). Mexico, United States (Arizona).
C. taosus (Ball, 1936). United States (New Mexico).
C. yana Young, 1977. Argentina, Brazil (Mato Grosso do Sul, Paraná, São Paulo), Bolivia.
Ciminus sp. nov. A Brazil (Paraná).
Ciminus sp. nov. B Brazil (Paraná).
Ciminus sp. nov. C Brazil (Paraná).

***Ciminius albolineatus* (Taschenberg, 1884)**

Figs 1-3, 18A-B, 29, 30B.

Tettigonia albolineata Taschenberg, 1884: 446.

Diagnosis. Pale yellow (Figs 1A-C, 2A-J, 18A-B), brown or black sharpshooters. Aedeagus (Fig 1G-H) with dorsal margin and apex rounded, without serrated processes on ventral margin. Paraphysis (Fig 1I-J) slightly curved ventrally, with a distinct preapical constriction on ventral margin, apex acute.

Measurements. Total length: males (n=20): 3.6- 4.4 mm, females (n=2): 4.0 – 4.6 mm.

Description. Head and thorax (Fig 1A-B, 2A, C, E, G, I, 18A). Crown, in dorsal view, slightly produced, anterior margin broadly rounded. Median length of crown from 1/4 to 1/2 of intraocular width, and 1/4 of transocular width. Pronotum width slightly greater than transocular width. Other features as in genus description.

Coloration. Overall (Figs 1A-C, 2A-J, 18A-B) coloration from pale-yellow to brown. Crown, in dorsal view, with distinct paler areas. Face with a pale band between eyes and frontogenal suture, muscular impressions yellow, often a pale longitudinal band medially. Clypeus yellow. Gena and lorum as in overall coloration or paler. Pronotum, in dorsal view, anterior third with distinct paler marks and darkened arched or semi-arched maculae, posterior third smoky paler. Mesonotum, in dorsal view, yellow, usually with pair of darkened triangular maculae laterally, pair of darkened rounded maculae medially, sometimes smoky, and usually with a smoky darkened band on transverse sulcus. Forewing veins distinctly pale, rarely indistinct. Abdomen, in lateral view, yellowish ventrally and darkened dorsally. Legs yellowish, metasternum usually darkened. Males, often with overall color black (Figs 2G-J), with similar marks and maculae as described in pale-yellow coloration, but sometimes less distinct. Abdomen entire black and legs smoky darkened. Females very rarely black.

Male terminalia. Pygofer (Fig 1D), in lateral view, with apex broadly rounded. Subgenital plate (Fig 1D-E), in lateral view, attaining pygofer half-length. Style (Fig 1F), in dorsal view, with preapical lobe. Aedeagus (Figs 1G-H), in lateral view, dorsal margin of shaft from slight to broadly rounded; ventral margin excavated basally and expanded distally, without processes; apex broadly rounded. Paraphysis (Figs 1I-J), in lateral view, curved ventrally, attaining pygofer apical third,

with conspicuous preapical constriction on ventral margin apex acute. Other features as in genus description.

Female terminalia. Sternite VII (Figs 3A-C), in ventral view, 1.8x wider than long, posterior margin with a slight median lobe. Valvula II (Figs 3F-H) blade with 14 continuous triangular serrated teeth, without distinct gap in anterior margin of teeth. Other features (Fig 3D-E, I-J) as in genus description.

Material studied. **Brazil: Goiás**: 6♂, 2♀ "Aragarças, GO [Goiás] \ Brasil 29.III.63 \ M. Alvarenga"; 4♂, 1♀ "Brasil, GO [Goiás], São Jorge \ P.N. [Parque Nacional] Chapada dos \ Veadeiros 14.1582°S \ 47.7823°W Sweep \ 25-26.III.2016 A. Martins". - **Mato Grosso**: 1♀ "Brasil, MT [Mato Grosso], Claudia, Fazen- \ da Continental, 11.5841°S \ 55.3003°W, 365m, light trap \ 17-19.vi.2017, RR Cavichioli \ & AC Domahovski"; 3♂, 1♀ "Chapada – MT [Mato Grosso] \ Brasil XI.63 \ M. Alvarenga"; 1♂, 1♀ "Chap. [Chapada] Guimarães – MT [Mato Grosso] \ 19.XI.1983 \ Exc. Dep. Zool. [Excursão Departamento de Zoologia] – UFPR \ (Polonoroeste)"; 1♀ "Cáceres, MT [Mato Grosso] \ 3.IV.1985 \ C. Elias leg. \ POLONOROESTE"; 1♀ "Diamantino, MT [Mato Grosso] / Brasil 16.II.65 / S. Laroca"; 16♂, 12♀ "Brasil, MT [Mato Grosso], Nova Ubiratã, \ E.S.E.C. [Estação Ecológica] Rio Ronuro, \ 13.1122°S, 54.4436°W, 330m \ light trap, 11-16.vi.2017, RR \ Cavichioli & AC Domahovski"; 1♀ same data as preceding; "areia rio"; 15♂, 22♀ "Brasil, MT [Mato Grosso], Novo Mundo, Pq. \ Est. [Parque Estadual] do Cristalino, 09.4517°S, 55.8396°W, 240m, light trap, \ 21-25.vi.2017, RR Cavichioli \ & AC Domahovski"; 1♀ same data as preceding; "sweep"; 1♀ "11Km Sul Rio Verde \ MT [Mato Grosso] – Brasil-05/XI/03 \ Mielke & Casagrande leg". **– Roraima**: 1♂ "Tepequene, Amajari, \ Roraima 820m 14- \ 15/VII/2009 O.M. Mielke & \ M. M. Casagrande. – **Rondônia**: 8♂, 6♀ "Brasil, RO [Rondônia], Guaporé \ 121605S 604230W LUZ \ 23.iv.2006 J.A. Rafael & \ F.F. Xavier F°". – **Paraná**: 1♂, 1♀ "Foz do Iguaçu \ Paraná, Brasil \ 11.XII.1966 \ Exc. Dept. ZOO [Excursão Departamento de Zoologia]"; 1♂ same datas as preceding; "3.XII.1966"; 2♂ "Brasil, Paraná, Tibagi, \ P.E. [Parque Estadual] do Guartelá, 1000m \ 24°33'47"S 50°15'26"W \ 21-24.II.2017 Sweep \ A. C. Domahovski leg."; 5♂ "Brasil, PR [Paraná], Curitiba, Centro \ Politécnico – UFPR, gramado \ proximidades prédio Biológicas \ 20-25.I.2022, Sweep \ A.C. Domahovski & L. Alasmar"; 1♂, 2♀ same data as preceding, "25°26'49"S 49°13'54"W, 925m, 22-25.XI.2022, A.C.

Domahovski"; 10♂ 5♀ "Brasil, PR, Ponta Grossa. P.E. [Parque Estadual] \ de Vila Velha, 25.247579°S \ 49.992188°W, 930m, Sweep, \ 14.XII.2022, A. P. Pinto, A. C. \ Domahovski, L. Alasmar, \ J. Ehlert & L. P. Aguiar leg". – **São Paulo**: 1♂, 1♀ "BRASIL, SP, S. J. do Barreiro, P. \ N. da Serra da Bocaina, arredores \ alojam., -22.733757, -44.616643, \ 1522m, sweep, 09-11.I.2023, \ AP Pinto, AC Domahovski, J \ Ehlert & LP Aguiar leg". All specimens were deposited at DZUP.

Remarks. Specimens of *C. albolineatus* and *C. platensis* apparently are the most abundantly collected species amongst the genus, and have external resemblances to each other, but they can be differentiated by male genitalia characters in the former as: aedeagus ventral margin without processes and paraphysis curved ventrally, with ventral margin bearing a preapical constriction. The material collected in "Centro Politécnico, UFPR, Curitiba, Paraná" and "Parque Estadual Vila Velha, Ponta Grossa, Paraná" sites presented a great number of males and a few females with black coloration. Until the present moment, this is the only occurrence of black females for the genus.

***Ciminius platensis* (Berg, 1879)**
Figs 4-5, 18C-D

Acocephalus dubius Berg, 1879: 259.

Diagnosis. Sharpshooters with coloration from pale-yellow to brown (Figs 4A-C, 18C-D). Aedeagus (Figs 4G-H) bearing from two to three large teeth in median third of ventral margin, apex broadly rounded, forming a hood-like structure. Paraphysis (Figs 4I-J) almost rectilinear in lateral view, directed posterodorsally, apex acute; in dorsal view, broad at base, strongly narrowing towards apex.
Measurements. Total length: males (n=20) 4.0 - 4.6 mm, females (n=20) 4.5 - 5.5 mm.

Description. Head and thorax (Figs 4A, 18C). Crown, in dorsal view, slightly pronounced, anterior margin from broadly rounded to subtriangular; median length of crown from 3/8 to 1/2 of intraocular width, and about 1/4 of transocular width. Pronotum width slightly greater than

transocular width. Ocelli aligned to imaginary line between anterior eye angles. Other features as in genus description.

Coloration. Overall coloration from pale-yellow to brown (Figs 4A-C, 18C-D), as described in *C. albolineatus*.

Male terminalia. Pygofer (Fig. 4D), in lateral view, posterior margin from broadly to narrowly rounded. Subgenital plate (Fig. 4D-E), in lateral view, slightly exceeding posteriorly to half length of pygofer. Style (Fig. 4F), in dorsal view, without preapical lobe. Aedeagus (Fig. 4G-H), in lateral view, shaft protuberant on basal half, ventral margin bearing two or three large teeth medially, apex expanded and rounded, forming a hood-like structure. Paraphysis (Fig. 4I-J), in lateral view, directed posterodorsally, rectilinear, dorsal and ventral margins subparallel, not attaining pygofer apical third, apex acute. Other features as in genus description.

Female terminalia. Sternite VII (Fig. 5A-C), in ventral view**,** 1.6x wider than long, posterior margin with a slight median lobe. Valvula II (Fig. 5F-H) blade with 12 continuous triangular serrated teeth, with a distinct gap in anterior margin of teeth. Other features (Figs 5D-E, I-J) as in genus description.

Material studied. Brasil: Rio Grande do Sul: 1♂ “Areias Brancas, \ Torres, RS, II.1983 \ K. Zanol leg”; 3♀ “Águas Belas, Viamão \ RS [Rio Grande do Sul] – BR [Brazil] 3-4/III/1980 \ K. Zanol col”; 1♂ “Brasil, Rio Grande do \ Sul, Santa \ Maria, UFSM, 29°43’02.2” \ S, 53°43’07”W, 08-II- \ 2023, C.V. Rodrigues, F. D. \ Souza, G. Flores”. – **Paraná**: 6♂, 6♀ “Curitiba, Paraná \ Brasil III-1983 \ Cavichioli leg”; 2♂, 2♀ same data as preceding; “Sakakibara leg”; 1♂, 7♀ same data as preceding; “A.M.S. e R.R.C.”; 1♂, 1♀ same data as preceding; “III-1982, Sakakibara leg”; 1♂ “Brasil, PR [Paraná], Piraquara, \ Mananciais da Serra Luz, \ 25°29’47”S, 48°58’54”W \ 1021m, 20.I.2022, A.P. Pinto, J. Ehlert & L. Polizeli”; 2♂, 2♀ “Brasil, PR [Paraná], Curitiba, Centro \ Politécnico – UFPR, gramado \ proximidades prédio Biológicas \ 20-25.I.2022, Sweep, \ A.C. Domahovski & L. Alasmar”; 2♂, 2♀ “Brasil, Paraná, Diamante \ do Norte, E. E. [Estação Ecológica] Caiuá \ 14.xii.2012 Luiz de \ Queiroz trap M. Savaris & S. Lampert leg.”; 1♂, 7♀ “Umuarama – Paraná \ Brasil II.1986 \ A. F. Yamamoto col”; 1♂, 1♀ “Porecatu, Paraná \ Brasil –

20/10/1970 \ Becker-Hatschback"; 1♂, 9♀ "Brasil, PR, Ponta Grossa. P.E. [Parque Estadual] \ de Vila Velha, 25.247579°S \ 49.992188°W, 930m, Sweep, \ 14.XII.2022, A. P. Pinto, A. C. \ Domahovski, L. Alasmar, \ J. Ehlert & L. P. Aguiar leg". **– Espírito Santo**: 1♂ "Brasil, ES [Espírito Santo], Linhares \ Res. [Reserva] Vale Rio Doce , sede \ 190905S – 400410W, \ 56m, 07.v.2007, J.A. \ Rafael & F.F. Xavier F°., \ luz"; 1♂, 3♀ "Linhares – ES [Espírito Santo] \ BR IX-1972 \ M. Alvarenga". – **Minas Gerais:** 2♂, 4♀ "Águas Vermelhas \ MG [Minas Gerais], XII.1983 \ M. Alvarenga – col"; 2♂, 12♀ " S. [São] Gonçalo Rio Abaixo, \ MG [Minas Gerais], Brasil, (Est. Amb [Estação Ambiental/ \ Peti-Cemig)15.IV.2013 \ light 19°53'02"S 43°22' \ 21"W A. Lima; A.F. \ Kumagai & P. Dias legs"; 1♀ "Brasil, Minas Gerais, \ Lavras, Campus UFLA \ 16-18.ix.2013 ~ 905m \ Malaise 21°13'50"S \ 44°58'32"W \ M.N. Morales" – **Mato Grosso do Sul**: 3♂, 5♀ "Brasil, Mato Grosso do \ Sul, Porto Murtinho, \ 07.xii.2012, light trap M. \ Savaris & S. Lampert". **– Bahia**: 1♂, 11♀ " Encruzilhada – Bahia \ Brasil 980m XI/74 \ M. Alvarenga leg."; 4♀ same data as preceding; "XII/80"; 4♀ "Brasil, BA [Bahia], Senhor do \ Bonfim, Serra Santana \ 1023223S – 401159W, \ 520m, 15.v.2007, J.A. \ Rafael & F. F. Xavier F°, luz". **– Ceará**: 35♂, 26♀ " Brasil, Ceará, Cratéus, \ RPPN (Reserva Particular do Patrimônio Natural] Serra das Almas \ 5.11°S 40.87°W 320m \ 18.V. 2014 light trap \ Melo & Rosa"; 2♂, 1♀ same data as preceding; "22.v.2014"; 17♂, 3♀ same data as preceding; "4.8107°S 38.9740°W \ 220m \ 15.V.2014". – **Pernambuco**: 3♂, 10♀ "Brasil, PE [Pernambuco], Afrânio, \ 083153S – 410259W, \ 550m, 16.v.2007, J.A. Rafael & F.F. Xavier \ F°, Manual". **– Piauí**: 2♂, 9♀ "Ubajara – PI [Piauí] – Brasil \ 846m 03°50'77"S \ 40°53'53"W Light \ 22.04.2012 \ R. R. Cavichioli leg"; 1♀ "Brasil, PI [Piauí], Cel. [Coronel] José Dias \ P.N. [Parque Nacional] da Serra da Capivara \ 590m 08°44'3.89"S \ 42°30'10.56"W 08-12.III. \ 2016 RM Feitosa, GP \ Camacho & FO Marfins". – **São Paulo**: 5♂, 1♀ "Brasil, São Paulo, Marília, \ 22.18927°S, 49.92630°W, \ 18-20.XI.2022, sweep, \ L. Alasmar leg."; 2♂ same data as preceding, "22.19384°S, 49.92172°W"; 2♂ same data as preceding, "22.16342°S, 50.00271°W, Condomínio Green Valley, 07.I.2023". All specimens were deposited at DZUP.

Remarks. *Ciminius platensis* is commonly collected by sweep in grasses, and along with *Ciminus sp. nov. A***,** do not present black specimens. They can be differentiated from the latter by the few and large teeth ventrally in aedeagus, and the shorter and rectilinear paraphysis.

Ciminius yana Young, 1977
Figs 6-9, 18E-F

Diagnosis. Small sharpshooters, with coloration (Figs 6, 7A-C, 8, 18E-F) pale-yellow to brown (females and rarely males) or black (males), with basis of R and claval veins yellow. Aedeagus (Fig 7G-H) with shaft strongly protuberant, forming a preapical lobate process on dorsal margin. Paraphysis (Figs 7I-J) curved ventrally, with a preapical constriction on ventral margin.

Measurements. Total length: males (n=11) 3.2 – 3.7 mm, females (n=6) 3.9 – 4.3 mm.

Description. Head and thorax (Figs 7A, 18E). Crown, in dorsal view, from slightly to moderated produced, anterior margin from broadly rounded to subtriangular. Median length of crown from 3/7 to 1/2 of intraocular width, and about 1/4 of transocular width. Pronotum width slightly greater than transocular width. Ocelli aligned to imaginary line between anterior eye angles. Other features as in genus description.

Coloration. Overall coloration (Figs 6, 7A-C, 8, 18E-F) from pale-yellow to brown, as described in *C. albolineatus*, specially in females. Males usually with overall coloration black, with marks, bands and maculae as described in *C. albolineatus.* Face (Figs 7C, 18F), with yellow marks on muscular impressions, often with yellow longitudinal band medially. Clypeus browned. Gena and lorum black with borders yellowish. Forewings (Figs 7A-B, 18E), with veins black, except costal cell, basis of claval suture and basis of R and C veins distinctly yellow. Legs yellowish. Abdomen black, lateral margins yellowish.

Male terminalia. Pygofer (Fig. 7D), in lateral view, posterior margin broadly rounded. Subgenital plate (Fig. 7D-E), in lateral view, slightly exceeding posteriorly to half-length of pygofer. Style (Fig. 7F), in dorsal view, without preapical lobe. Aedeagus (Fig. 7G-H), in lateral view, shaft with a preapical lobate process, directed posteroventrally, ventral margin without processes, apex rounded, not expanded. Paraphysis (Fig. 7I-J), in lateral view, curved and directed posteroventrally, almost attaining pygofer apical third, with a conspicuous preapical constriction in ventral margin, apex acute. Other features as in genus description.

Female terminalia. Sternite VII (Fig. 9A-C), in ventral view**,** 1.95x wider than long, posterior margin with median lobe distinct. Valvula II (Fig. 9F-H) blade with 13 continuous subtriangular serrated teeth, without distinct gap in anterior margin of teeth. Other features (Figs 9D-E, I-J) as in genus description.

Material examined. Brasil: **Paraná:** 1♂ "Brasil, PR [Paraná], Antonina\ Res. [Reserva] Rio Cachoeira, 50m\ 25.316°S 48.696°W\ 23-27.I.2017, Luz solo\ A.C. Domahovski leg."; 1♀ same data as for preceding; 23-27.I.2017, L. suspensa\ Entomologia UFPR". – **Mato Grosso:** 1♂ "Barranco Branco\Matto Grosso\ 22/12/1925 \ Souto Maior". – **São Paulo**: 1♂ "Brasil, São Paulo, Marília, \ 22.19384°S, 49.92172°W, \ 20.XI.2022, sweep, \ L. Alasmar leg."; 2♂, 2♀ "Brasil, São Paulo, Marília, \ 22.18927°S, 49.92630°W, \ 18-20.XI.2022, sweep, \ L. Alasmar leg." (DZUP); 1♂ "Brasil, São Paulo, Marília, \ 22.18927°S, 49.92630°W, \ 26.XII.2022, sweep, \ L. Alasmar leg."; 6♂, 3♀ "Brasil, São Paulo, Marília, \ 22.16342ºS, 50.00271ºW \ Condomínio Green Valley \ 07.I.2023, sweep, \ L. Alasmar leg.". All specimens were deposited at DZUP.

Remarks. Externally, black males of *C. yana* resemble *Ciminus sp. nov. A* and *Ciminus sp. nov. B* and pale-yellow to brown males are more similar to *C. albolineatus* and *C. platensis.* The black specimens can be distinguished from the others of the genus by the distinct yellow marks on claval suture and basis of R and C veins. Furthermore, all the males of *C. yana* can be distinguished from any others of the genus by the conspicuously lobate process in the aedeagus dorsal margin. From all the studied material, a unique black specimen of *C. yana* presented the forewings venation totally yellow.

Ciminius sp. nov A

Figs 10-11, 19A-B

Diagnosis. Pale-yellow sharpshooters (Figs 10A-C, 19A-B), with distinct copper marks in crown, first anal and cubital veins of forewings; inner margin, claval suture and R vein distinctly whitened. Aedeagus (Fig. 10G-H) ventral margin serrated medially, rectilinear subapically, with apex

expanded, forming a hood-like structure. Paraphysis (Fig. 10I-J) directed posterodorsally, with a preapical constriction in ventral margin.

Measurements. Total length: holotype male 4.0 mm; paratypes, males (n=3) 4.0 – 4.3 mm; paratype female 4.5 mm.

Description. Head and thorax (Figs 10A, 19A). Crown, in dorsal view, slightly pronounced, anterior margin subtriangular. Median length of crown from 2/7 to 1/2 of intraocular width, and about 2/5 of transocular width. Pronotum width approximately equal to transocular width. Ocelli located slightly before the imaginary line between anterior eye angles. Other features as in genus description.

Coloration. Overall coloration pale-yellow (Figs 10A-C, 19A-B). Crown (Figs 10A, 19A), in dorsal view, with distinct browned areas. Pronotum, in dorsal view, anterior third with distinct browned marks and darkened arched maculae, posterior thirds smoky paler. Forewing (Figs 10A-B, 19A) with cubital and anal veins distinct copper-brown, R vein, claval suture and forewings inner margin whitened, other veins yellow. Other features as in *C. albolineatus* description.

Male terminalia. Pygofer (Fig. 10D), in lateral view, posterior margin from broadly to narrowly rounded. Subgenital plate (Fig. 10D-E), in lateral view, almost reaching half length of pygofer. Style (Fig. 10F), in dorsal view, with preapical lobe. Aedeagus (Fig. 10G-H), in lateral view, shaft from slightly to broadly protuberant, ventral margin with serrated processes medially, rectilinear subapically, apex rounded, forming a hood-like structure. Paraphysis (Fig. 10I-J), in lateral view, directed posterodorsally, curved dorsally, almost reaching pygofer apical third, with a conspicuous preapical constriction in ventral margin, apex acute. Other features as in genus description.

Female terminalia. Sternite VII (Fig. 11A-C), in ventral view**,** 1.9x wider than long, with a distinct median lobe. Valvula II (Fig. 11F-H) blade with 14 continuous triangular serrated teeth, without a distinct gap in anterior margin of teeth. Other features (Fig. 11D-E, I-J) as in genus description.

Material studied. Holotype male: Brazil: Paraná: "Brasil, Paraná, Ponta\Grossa, Parque Esta-\dual de Vila Velha\ 11.iv.2015, sweep\ A.C. Domahovski leg.". **Paratypes:** 3♂, 1♀; same data as holotype; 2♂ "Brasil, PR [Paraná], Ponta Grossa, P.E. [Parque Estadual] \ Vila Velha, 24.III.2016, Pratos\ amarelos, B. Rosa & C. Yamakawa.". All specimens were deposited at DZUP.

Remarks. *Ciminius sp. nov. A* specimens assemble externally with *C. albolineatus* and *C. platensis* due to their size and overall coloration, especially due to conservation of the specimens, which the copper features may become faded. *Ciminius sp. nov. A* can be differentiated from the other *Ciminius* species by the following male genitalia aspects: aedeagus shaft distinctly rounded, ventral margin with serrated processes medially and rectilinear subapically and paraphysis curved dorsally, with a distinct preapical constriction ventrally. The specimens of *Ciminus sp. nov. A* presents aedeagus variations. In seven specimens studied, there was variations in shaft roundness, which can be strongly or moderately rounded, and in basiventral margin, which can be rectilinear or with a reentrance. The most distinct patterns were provided in the illustration (Fig 10G). The paraphysis structure presented a variation in curvature degree, from slight to distinctly curved, but shapes remains the same.

Ciminius sp. nov. B

Figs 12-14,19C-D, 35C

Diagnosis. Black (males) (Fig. 12A-B) or reddish (Figs 13, 19C-D) (females, rarely males) sharpshooters. Aedeagus (Fig. 12G-H) shape distinctly wide in lateral view, ventral margin entirely serrated, apex broadly rounded, forming a hood-like structure. Paraphysis (Fig. 12I-J) almost straight, ventral and dorsal margins parallel, apex subacute.

Measurements. Total length: holotype male 3.9 mm; paratypes, males (n=19) 3.8 - 4.2 mm; females (n=20) 4.6 - 5.2 mm.

Description. Head and thorax (Figs 12A, 13, 19C). Crown, in dorsal view, slightly pronounced, anterior margin often subtriangular, rarely broadly rounded; median length from 1/6 to 1/5 of

intraocular width, and about 1/3 of transocular width. Pronotum width approximately equal to transocular width. Ocelli located slightly before the imaginary line between anterior eye angles. Other features as in genus description.

Coloration. Females (Fig. 19C) with crown and pronotum browned, with marks and maculae as in *C. albolineatus*. Forewings distinctly reddish, with veins yellow. Abdomen (Fig. 35C), in ventral view, darkened, with lateral margins and terminalia yellow, prosternum and metasternum darkened. Legs yellow. Other features as described in *C. albolineatus.* Males (Figs 12A-C, 13), rarely as females, mostly with overall coloration black, with marks, bands, and maculae as in *C. albolineatus*, but with marks often reddish and smoother. Face (Figs 12C, 12B, 19D), with yellow marks in muscular impressions, often with a yellow longitudinal band medially. Clypeus darkened with yellowed areas medially. Gena and lorum yellow with darkened areas. Pronotum (Figs 12A, 13A, 19C) posterior thirds often entire black. Forewings basis laterally yellowish or reddish, veins dark. Abdomen darkened, lateral margins yellow.

Male terminalia. Pygofer (Fig. 12D), in lateral view, posterior margin rounded. Subgenital plate (Fig. 12D-E), in lateral view, slightly surpass half of pygofer. Style (Fig. 12F), in dorsal view, with preapical lobe. Aedeagus (Figs 12G-H), in lateral view, conspicuously wide, shaft slightly protuberant, ventral margin entirely serrated, apex expanded and rounded, forming a hood-like structure. Paraphysis (Fig. 12I-J), in lateral view, directed posteroventrally, almost straight, not attaining pygofer apical third, dorsal and ventral margins subparallel, apex subacute. Other features as in genus description.

Female terminalia. Sternite VII (Fig. 14A-C), in ventral view**,** 1.7x wider than long, posterior margin with a nearly indistinct median lobe. Valvula II (Fig. 14F-G) blade with 18 continuous triangular serrated teeth, without a distinct gap in anterior margin of teeth. Other features (Fig. 14D-E, I-J) as in genus description.

Material studied. Holotype male: Brazil: Paraná: "Brasil, Paraná, Ponta\Grossa, Parque Esta-\dual de Vila Velha\ 11.iv.2015, sweep\ A.C. Domahovski leg." (DZUP). **Paratypes:** 2♂, same data as for holotype (DZUP); 1♂ "P.E. [Parque Estadual] Vila Velha, Ponta\Grossa, PR [Parana],

Brasil\ 25.XI.2011, 965m, Light\ 25°13'49"S 49°59'65"W\ A.C. Domahovski leg." (DZUP); 1♂ "Brasil, PR [Paraná], Ponta Grossa, P.E. [Parque Estadual]\Vila Velha, 24.III.2016, Pratos\ amarelos, B. Rosa & C. Yamakawa"; 1♂ "Brasil, PR [Paraná], Ponta Grossa, P.E. [Parque Estadual]\Vila Velha, 21.XI.2015, Pratos\ amarelos, B. Rosa & C. Yamakawa"; 45♂ 51♀ "Brasil, PR, Ponta Grossa, P.E. [Parque Estadual] \ de Vila Velha, 25.247579°S, \ 49.992188°W, 930m, Sweep, \ 14.XII.2022, A. P. Pinto, A. C. \ Domahovski, L. Alasmar, \ J. Ehlert & L. P. Aguiar leg. All specimens were deposited at DZUP.

Remarks. The black male specimens from *Ciminius sp. nov. B* externally resembles C. *yana, Ciminus sp. nov. C* and the black male specimens of *C. albolineatus*, due to coloration and size. Although, *Ciminius sp. nov. B* tends to present more distinct yellow areas in pronotum and head, and in laterals, can also be reddish, different from *Ciminus sp. nov. C* and *C. yana*, and the forewings venation is never yellow, different from *C. albolineatus*. *Ciminius sp. nov. B* males can be distinguished from the other species of the genus by the distinct wide aspect of the aedeagus in lateral view, with serrated processes occupying the entire ventral margin, restricted to anterior thirds in *Ciminus sp. nov. C,* and the females, for the distinct reddish forewing coloration. In a total of 51 males of *Ciminus sp. nov. B* studied, 47 males were black and 4 were reddish.

Ciminius sp. nov. C

Figs 15-17, 19E-F, 35

Diagnosis. Small sharpshooters with coloration (Figs 15A-C, 16, 19E-F) pale-yellow or black (only males). Black males (Fig. 15A-C) usually without yellowish marks, when present, restricted to pronotum lateral margins and posteriorly to mesonotum transversal sulcus. Aedeagus (Fig. 15G-H) ventral margin with serrated processes, apex expanded forming a hood-like structure. Paraphysis (Figs 15I-J) directed posterodorsally, rectilinear, dorsal and ventral margins subparallel, apex subacute.

Measurements. Total length: holotype male 3.6 mm; paratypes, males (n=19) 3.4 - 3.8 mm; paratypes, females (n=20) 3.7 - 4.1 mm.

Description. Head and thorax. Crown (Figs 15A, 16A, 19E, 35A,D), in dorsal view, slightly pronounced, anterior margin subtriangular. Median length of crown from 1/4 to 1/3 of intraocular width, and from 2/5 to 1/2 of transocular width. Pronotum width approximately equal to transocular width. Ocelli located slightly before the imaginary line between anterior eye angles. Other features as in genus description.

Coloration. Females (Figs 19E-F, 35) with overall coloration pale-yellow, with features as described in *C. albolineatus*. Males, rarely as females (Fig. 16), mostly with overall coloration black (Fig. 15A-C). Crown and pronotum (Fig. 15A-B) often entirely black, rarely with smooth paler areas, arched laterally in pronotum. Face (Fig. 15C) with a yellow band between eyes and frontogenal suture, sometimes surpass the suture forming a smoky band in frons, yellow marks in muscular impressions, often with a yellow longitudinal band medially. Clypeus black. Gena and lorum yellowed. Mesonotum (Fig. 15A), black anteriorly to transversal sulcus and yellow posteriorly. Forewings (Fig. 15A-B) veins dark. Legs yellow. Abdomen, in lateral view, blackened, bordered with yellow.

Male terminalia. Pygofer (Fig. 15D), in lateral view, posterior margin from broadly to narrowly rounded. Subgenital plate (Fig. 15E), in lateral view, slightly surpass half of pygofer. Style (Fig. 15F), in dorsal view, without preapical lobe. Aedeagus (Fig 15G-H), in lateral view, shaft slightly protuberant, ventral margin anterior two-thirds serrated, apex rounded, forming a hood-like structure. Paraphysis (Fig. 15I-J), in lateral view, directed posterodorsally, rectilinear, reaching pygofer apical third; dorsal and ventral margins subparallel; apex from acute to subacute. Other features as in genus description.

Female genitalia. Sternite VII (Fig. 17A-C), in ventral view**,** 2x wider than long, posterior margin with a distinctly median lobe. Valvula II (Fig. 17F-H) blade with 18 continuous subtriangular serrated teeth, with a distinct gap in anterior margin of teeth. Other features (Fig. 17D-E, I-J) as in genus description.

Material examined. Holotype male: Brazil: Paraná: “Brasil, Paraná, S.J. [São José] dos \ Pinhais, 25°36'18"S 49°11'37"W, 880m \ 08-22.IV.2017, Sweep \ A.C. Domahovski leg.”.

Paratypes: 14♂, 1♀ same data as holotype; 2♂, 1♀ same collection data as preceding; 07-21.I.2017; 4♂,1♀ same collection data as preceding; 25-28.II.2017; 10♂, 5♀ same collection data as preceding; 02-05.III.2019; 2♂ same collection data as preceding 01-31.III.2021; 1♂, 1♀ same collection data as preceding; 01-30.XI.2022; 12♂, 3♀ "Brasil, PR [Paraná], Curitiba, Centro\ Politécnico-UFPR, gramado \ proximidades prédio Biológicas\ 20-25.I.2022, Sweep \ A.C. Domahovski & L. Alasmar. All specimens were deposited at DZUP.

Remarks. *Ciminius sp. nov. C* resemble externally to other black males of the genus: *C. yana*, *C. albolineatus*, and *Ciminus. sp. nov. B*, but *Ciminus sp. nov. C* have a more homogeneous black aspect, with indistinct or nearly indistinct yellow marks. The only constant yellow mark is in the posterior half of the mesonotum. Internally, the males of *Ciminus sp. nov. C* can be distinguished from *C. yana* for lacking a lobate distinct process on dorsal margin, from *C. albolineatus* for bearing a ventral margin serrated, and from *Ciminus sp. nov. B*, for the ventral margin being serrated on anterior thirds, not entirely. In the locality of Centro Politécnico, mostly females presented the submacroptery condition, which is discussed furthermore.

3.2 Description of *Ciminius* sp. immature stages

Figs 21-27

1st instar (Figs 21A, 22). Coloration reddish yellow, with yellowish marks in body laterals and abdomen; frons yellowish; a longitudinal pale band from crown to apex of abdomen; posterior margin with a pair of darkened maculae between ocelli. Pronotum with a pair of transversal darkened bands, arising from lateral margins and extending almost medially, a pair of rounded dark macula medially. Mesonotum and metanotum with darkened areas medially. Metanotum with three pairs of darkened spots forming a triangle each side of median line.

Head, in dorsal view, 1.4x wider than long, anterior margin broadly rounded, slightly emarginated medially, antennal ledges not prominent, scape and pedicel distinct and visible; in lateral view, compound eyes rounded, frons slightly inflated, with clypeus visibly separated; in ventral view, muscle impressions distinct, rostrum with three segments, surpass metathoraxic coxae basis. Pronotum, in dorsal view, slender, slightly greater than head width. Mesonotum, in dorsal view, width approximately equal to pronotum width, median lobe rounded with slightly smaller postero-

lateral angles. Metanotum, in dorsal view, length approximately equal to pronotum and mesonotum widths combined. Tarsi with two segments, basal smaller than distal, the latter ending in a pair of claws. Abdomen with nine visible segments, the first and second fused and 10th and 11th forming the anal tube.

2nd instar (Figs 21B, 23). Overall coloration similar to anterior instar, with pale-yellow coloration more consistent and intense, macula and marks more distinct, especially the pair of maculae between the eyes. Metanotum with three pairs of darkened more aligned. Abdomen with the reddish areas smoother.

Head, in dorsal view, anterior margin broadly rounded, with a very slight emargination; other head features as in anterior instar. Pronotum, mesonotum and metanotum proportions as in anterior instar. Mesonotum with median lobe and postero-lateral angles more distinct. Metanotum with width greater than pronotum and mesonotum width combined. Abdomen as in anterior instar, with a segmentation more distinct and apex more sclerotized, initiating the terminalia structures formation.

3rd instar (Figs 21C, 24). Overall pale-yellow coloration more homogeneous, with darkened macula and marks of head and pronotum more distinct. Abdomen with reddish areas smoother and restricted to ventral portion. Pronotum and metanotum with posterior margin with a transverse smoky stripe. Frons, with marks in muscular impressions and longitudinal band beginning to distinguish; rostrum darkened.

Head, in dorsal view, with anterior margin rounded, other features of head as in anterior instar. Pronotum begins to elongate. Mesonotum with width of latero-posterior angles almost twice than median lobe width. Metanotum with latero-posterior angles reaching the first and second abdominal segments, indicating the beginning of wing pads development. Legs structures as in anterior instar, with setae thin, more distinct and elongate. Abdomen with strong segmentation, terminalia as in anterior instar.

4th instar (Figs 21D, 25). Overall coloration as in anterior instar, with macula in crown and pronotum marks very distinct and darkened, forewings venation color beginning to distinguish. Frons with muscular impressions very distinct and rostrum darkened. Mesonotum wing pads with

three darkened stripes. Metanotum wing pads with an elongated maculae arising from posterior margin and extending anterad. Abdomen reddish marks faded.
Head and head features as in anterior instar, with ocelli beginning to distinguish. Pronotum length greater than median lobe length. Mesonotum with wing pads developed, almost reaching metanotum wing pads, which attains abdominal third segment. Legs with setae stouter and distinct. Abdomen with strong segmentation, terminalia sclerotized and conspicuous, with pygofer and ventral parts very distinguished.

5th instar (Figs 21E, 26). Overall coloration as in anterior instar, with paler areas and macula as in adults (see generic description), frons with very distinct and yellowed muscular impressions, with darkened areas around. Mesonotum wing pads with darkened stripes thinner and more defined.
Head with anterior margin from broadly rounded to subtriangular, compound eye oval, ocelli distinct, other features as in anterior instar. Pronotum elongate. Mesonotum with median lobe elongate and posterior margin triangular, wing pads well developed, reaching forth abdominal segment. Metanotum with wing pads well developed, slightly longer than mesonotum wing pads. Abdomen with well-developed terminalia and distinct sexes.
Female (Fig. 27A): subgenital plates elongate, with length reaching pygofer apical third, with a complete median slit.
Male (Fig. 27B): subgenital plates short, length not attaining pygofer apical half, with a median slit restricted to apical portion (Marucci et al. 2000).

Remarks. The first and second stages are quite similar, but the latter can be differentiated by the following characters: (1) size of head and overall features more robust, (1) reddish coloration smoother and restricted to abdomen, (3) metanotum more elongate in latero-posterior portions.
The third instar presents the macula and the paler areas in crown and pronotum very distinct, the overall pale-yellow coloration is more homogeneous as the reddish features are fading. But the remarkable characters of this stage are: (3) distinction of facial muscular impressions; (2) presence of the setae in hind legs, (3) beginning of sclerotization and distinction of the terminalia.
The fourth and fifth stages are very similar in overall coloration but can be separated from each other by the proportion and length of wing pads: in fourth instar, the wing pads of mesonotum do not attain the apex of metanotum wing pads, and the latter attains to median third of abdomen third

segment. In the fifth instar, the mesonotum wing pads tangency the apex of metanotum wing pads, and the latter extend until fourth abdominal segment half.

All the immature specimens were collected with the sweep method. The material is stored with the following precedence label: “Curitiba, Paraná, Brazil, UFPR – Centro Politécnico – Estacionamento, varredura, XII.2022”. The *Ciminius* nymphs presents the particularity of showing, even in first instar, the patterns of adult coloration, especially the maculae in pronotum and mesonotum, allowing to easily recognize the genus. As the nymph develops, is possible to note the reddish coloration of abdomen turning into yellow, which in adult turns into an even more darkened coloration. Although that are many characters that allows the recognition of the genus, it is not possible to identify the fellow nymph species. Some specimens collected, especially in fourth and fifth instars, presented a more darkened overall coloration, possibly turning into a black adult. However, in the collection site, there are occurrence of three species, C. platensis, *C. albolineatus,* and *Ciminus sp. nov. C*, which the last two presents adults with black coloration.

Key to males of Neotropical *Ciminius*

1 Aedeagus ventral margin without processes (Figs 1G, 7G), paraphysis conspicuously curved ventrally (Figs 1I, 7I) …...……..……...…….. 2

1’Aedeagus ventral margin with serrated processes (Figs 4G, 10G, 12G, 15G), paraphysis rectilinear (Fig. 5I) or slightly curved ventrally (Figs 9I, 11I, 14I) ……..…. 3

2 Aedeagus with a conspicuous process in dorsal margin, forming a lobe (Fig. 7G), paraphysis strongly curved ventrally (Fig. 7I), males usually black, with only R1 vein basis distinct (Fig. 7A-B)…….…… ***C. yana*** Young, 1977

2’ Aedeagus directed ventrally, without processes, apex broadly rounded (Fig. 1G), paraphysis curved ventrally (Fig 1I), when males black, veins distinctly paler (Fig. 2H-J) ……..… ***C. albolineatus*** Taschenberg, 1884

3 Aedeagus conspicuously broad, ventral margin entirely serrated (Fig. 12G), paraphysis slightly curved ventrally (Fig. 12I), males commonly black (Fig. 12A-C) and rarely reddish (Fig 13)……..……. ***Ciminus sp. nov B***

3’ Aedeagus and paraphysis not as above …..…….……...……..……..……... 4

4 Aedeagus ventral margin with a maximum of three large serrated processes (Fig. 4G), paraphysis short and almost rectilinear, with apex slightly directed dorsally (Fig. 4I) ……..……..……...…. ***C. platensis*** (Berg, 1879)

4’ Aedeagus ventral margin with many small serrated processes (Figs 9G, 14G) paraphysis long and directed dorsally (Figs 10G, 15G)……..…..……...……. 5

5 Aedeagus with a conspicuous basidorsal expansion, ventral margin with few small serrated processes anteapically (Fig. 10G), paraphysis long with a preapical constriction ventrally (Fig. 10I), males pale-yellow (Fig. 10A-C)……...…...…… ***C****iminus* ***sp. nov A***

5’ Aedeagus with a slight basidorsal expansion, with many small serrated processes along ventral margin (Fig. 15G), paraphysis ventral margin without preapical constriction (Fig. 14I), males usually black (Fig. 15A-C) ……..... ***C****iminus* ***sp. nov. C***

3.1.1 *New genus A*

Fig. 28

Type species. *New genus A sp. nov. D*

Diagnosis. Small sharpshooters, size about 5.5 mm, overall coloration (Fig. 28A-C) reddish with several yellowish spots on crown, frons and pronotum; forewings reddish, with yellow veins and spots. Forewing (Fig. 28B) with some supranumerary veins on apical portion. Male genitalia with stem of connective (Fig. 28I) not well sclerotized, articulated with connective. Aedeagus (Fig. 28G-H) symmetrical, directed posteroventrally, with shaft short, without processes. Paraphysis (Fig. 28I-J) with ramus long and robust, extending to pygofer apex, broadened at base and narrowing to a well sclerotized subacute apex.

Description. Head and thorax (Fig. 28A-C). Crown, in dorsal view, moderated pronounced, anterior margin subtriangular, without concavities between ocelli, surface with texture slightly punctate, with fovea between eyes and ocelli, without a carina in transition from crown to face. Median length of crown 1/3 of transocular width, and 1⁄2 of intraocular width. Ocelli located before the imaginary line between anterior eye angles, closer to adjacent eye angle than to median line.

Frontogenal suture extending to crown, reaching ocelli. Antennal ledge, in dorsal view, not protuberant; in lateral view, rounded, not carinated. Frons, in lateral view, slightly oblique, not inflated medially; in frontal view, texture slightly punctate, muscular impressions distinct; epistomal suture complete. Clypeus, in frontal view, with apical margin rounded; in lateral view, continuing frons contour, without pubescence. Pronotum, in dorsal view, with width slightly greater than transocular width, anterior third with texture slightly punctate, posterior third transversely rugulose, without pubescence; in lateral view, dorsopleural carina complete. Mesonotum, in dorsal view, slightly punctate anterior to transverse sulcus and transversely rugulose posteriorly. Forewing (Fig. 28A-B) opaque, texture slightly punctate, veins distinct and elevated, membrane distinct with four apical cells, which the base of fourth is more proximal to base of third than to clavus apex; with three closed anteapical cells; with some supranumerary veins on apical portion; appendix narrow. Hind leg (Fig. 28B) with femoral setal formula 2:1:1; first tarsomere shorter than combined length of two more distal tarsomeres, with two parallel longitudinal rows of small setae on plantar surface. Sternite II of abdomen with pair of inner small triangular apodemes.

Male terminalia. Pygofer (Fig. 28D), in lateral view, moderately produced, without processes; posterior margin broadly rounded; macrosetae distributed along the entire disk; microsetae along posterior margin. Valve (Fig. 28E), in ventral view, slender, anterior margin concave, lateral margins peaked anteriorly. Subgenital plate (Fig. 28D-E), in ventral view, not fused to its counterparts; triangular, narrowing abruptly towards apex; outer margin with uniseriate row of macrosetae, microsetae present basally; in lateral view, short, extending nearly to pygofer half. Style (Fig. 28F), in dorsal view, surpassing posteriorly the connective apex, preapical lobe developed and rounded, apex distinctly sclerotized and truncated. Connective (Fig. 28F), in dorsal view, U-shaped, as long as wide, arms narrowed. Stem of connective (Fig. 28I) occurring as a separate sclerite, long, not well sclerotized, connecting anteriorly to connective and posteriorly to paraphysis arms. Aedeagus (Fig. 28G-H), symmetrical, directed posteroventrally, without processes, shaft slightly curved ventrally; apex expanded, rounded; in caudoventral view, expanded preapically, apical third heart-shaped, gonopore apical. Paraphysis (Fig. 28I-J) large, in lateral view, extending nearly pygofer apex, with a pair of symmetrical arms directed dorsally,

articulated with a long robust ramus directed posterodorsally, broadened basally and narrowing gradually to a subacute and well sclerotized apex.

Female terminalia. Unknown.

Remarks. *New genus A* shares similarities with *Ciminius* and *Tylozygus*, especially in the male terminalia, such as: (1) pygofer moderately produced, with macrosetae distributed along the entire disk, (2) subgenital plates triangular, short, not extending posteriorly to half of pygofer (3) styles short with apex truncate (4) stem of connective occurring as a separated sclerite. Although, the new genus can be promptly differentiated from *Ciminius* and *Tylozygus* by the combination of characters below: (1) somewhat flattened dorsoventrally; (2) head moderately pronounced, with anterior margin subtriangular; (3) forewings with three anteapical cells, median one opened basally; (4) paraphysis large and well sclerotized. The paraphysis of the new genus is similar to *Ciminius* due to the presence of a single ramus, whereas in *Tylozygus* the paraphyses have two rami.

New genus A sp. nov. D
Fig 28

Measurements. Holotype male 5.28 mm; paratype male 5.65 mm.

Coloration. Crown (Fig. 28A), in dorsal view, with black background, with several yellow spots, pair of larger black rounded maculae behind ocelli, adjacent to posterior margin. Face (Fig. 28B-C), black, with several yellow spots and transverse straps on muscular impressions. Gena black with portion below eye and near lateral margin of frons yellow. Clypeus, and lorum entirely black. Pronotum (Fig. 28A), in dorsal view, black, with several yellow spots, anterior third with pair of large transversal yellowish maculae, arising from lateral margins and almost reaching each other medially, posterior margin reddish. Mesonotum (Fig. 28A), in dorsal view, black background, with a pair of orangish triangular maculae laterally, yellowish irregular maculae medially, and orangish areas posteriorly to transverse sulcus. Forewing (Figs. 28A-B) reddish, with several yellow spots, mainly on anterior half; veins yellow; anal margin yellow; apical portion smoky. Thorax (Fig.

28B-C), in ventral view, black; legs black, distal portion of coxae whitened, distal portions of fore and mid legs and median portions of hind leg yellowish or reddish. Abdomen black, pygofer pale.

Material examined. Holotype male: Brazil: Paraná "Brasil, PR, Curitiba, Centro \ Politécnico, estacionamento \ do Biológicas, 25°26'49"S, \ 49°13'54"W, 925m, XII.2022 \ AC Domahovski & L. Alasmar". **Paratype:** 1♂; same data as holotype. All specimens were deposited at DZUP.

3.3 Phylogenetic Analysis

Fig. 33

The data matrix (Supplementary material S1) consisted of 20 taxa and 56 characters being one of overall coloration, 4 from head, 9 from thorax, 2 from male abdomen, 23 from male genitalia and 17 from female genitalia. From these characters, 12 were coded as multistate and 46 as binary. In the characters listed below, we provided to each one the number of steps (L), consistency index (ci) and retention index (ri). The monophyly of *Ciminius* was always strongly supported, using the implied weighting, with K=3 (SR = 94) or with equal weighting (SR = 86). Our matrix produced only one three for implied weighting that will be the hypothesis discussed (Fig 31). The internal relationships of *Ciminius* were always recovered with low to moderate support, except for *C. albolineatus* + *C. yana*, which presented a high support.

List of Characters

1.Ground color of body: (0) green, (1) pale-yellow or brown (Figs 1A-C, 2A-F, 4A-C, 8, 10A-C, 16,17, 18A-F, 19A-B,E-F) (2) black (Figs 2G-J, 7A-C, 12A-C, 15A-C), (3) reddish (Fig 13, 19C-D, 28A-C). (L:5; ci: 60; ri: 77)

2. Crown, black rounded maculae medially, presence: (0) absent, (1) present. (L:3; ci: 33; ri: 33)

3. Crown, posterior margin, pair of dark rounded maculae behind ocelli, presence: (0) absent, (1) present (Fig 1A). (L:1; ci: 100; ri: 100)

4. Frons, muscular impressions, aspect: (0) indistinct (Fig 31D), (1) distinct (Fig 1C). (L:2; ci: 50; ri: 75)

5. Face, clypeus, shape in males: (0) not swollen (Figs 1B-C, 3B-C), (1) swollen at base, not forming lobes (Figs, 31A-B) (2) swollen at base as a pair of lobes (Figs 31C-D). (L:3; ci: 66; ri: 75)

6. Pronotum, texture: (0) slightly strigate (Fig 7A), (1) punctate (Fig 31A), (2) strongly strigate in basal third. (L:2; ci: 100; ri: 100)

7. Pronotum, color aspect: (0) uniform, (1) marked (Fig 1A). (L:3; ci: 33; ri: 77)

8. Pronotum, posterior margin, aspect: (0) rectilinear (Fig 28A), (1) with median reentrance (Fig 1A). (L:3; ci: 33; ri: 75)

9. Forewing, venation, color: (0) darkened (Fig 15A), (1) paler (Fig 1A). (L:4; ci: 25; ri: 57)

10. Forewing, anteapical cells, number: (0) three (Fig 28B), (1) two (Figs 1B, 29A). (L:1; ci: 100; ri: 100)

11. Forewing, inner anteapical cell, aspect of base: (0) closed (Fig 29A), (1) opened. (L:3; ci: 33; ri: 50)

12. Forewing, median anteapical cell, aspect of base: (0) closed, (1) opened. (L:2; ci: 50; ri: 80)

13. Forewing, outer anteapical cell, aspect of base: (0) closed, (1) opened (Fig 29A). (L:2; ci: 50; ri: 83)

14. Forewing, R1 vein, plexus of veins, presence: (0) absent, (1) present (Fig 1B, 29A). (L:1; ci: 100; ri: 100)

15. Abdomen, sternite II, inner apodemes, presence: (0) absent, (1) present (Fig 30). (L:2; ci: 50; ri: 85)

16. Abdomen, sternite II, aspect of apodemes: (0) short (Fig 28B), (1) long (Fig 30A). (L:2; ci: 50; ri: 50)

17. Male pygofer, apex, aspect: (0) broadly rounded (Fig 28D). (1) narrowly rounded, (2) peaked. (L:3; ci: 66; ri: 80)

18. Male pygofer, macrosetae, distribution: (0) apical third, (1) apical third and ventral margin, (2) entire disk (Figs 2D, 28D). (L:3; ci: 66; ri: 83)

19. Subgenital plates, length: (0) attaining or slightly surpassing half length of pygofer (Fig 1D), (1) attaining pygofer apex. (L:3; ci: 33; ri: 60)

20. Subgenital plates, shape: (0) gradually tapering towards apex (Fig 1E), (1) abruptly tapering. (L:1; ci: 100; ri: 100)

21. Connective, arms, aspect: (0) u-shaped (Figs 1F, 3F), (1) bar shaped. (L:3; ci: 33; ri: 60)

22. Stem of connective, length: (0) short, (1) long (Fig 1I, 30A,C,E). (L:1; ci: 100; ri: 100)

23. Stem of connective, aspect: (0) rectilinear (Fig 32A), (1) curved (Fig 32C), (2) keeled (Fig 32E). (L:2; ci: 100; ri: 100)

24. Stem of connective, articulation with connective arms, presence: (0) absent (Fig 32A-B), (1) present (Fig 32C-F). (L:1; ci: 100; ri: 100)

25. Paraphysis or paraphyses, presence: (0) absent, (1) present (Fig 1I-J, 3I-J, 32A-F). (L:2; ci: 50; ri: 50)

26. Paraphysis or paraphyses, number of rami: (0) one (Fig. 1I-J, 28I-J, 32E-F) (paraphysis), (1) two (Fig 32A-D) (paraphyses). (L:2; ci: 50; ri: 85)

27. Paraphysis or paraphyses, arm-ramus/rami articulation, presence: (0) absent (Fig 32A), (1) present (Fig 1I, 32C, E). (L:1; ci: 100; ri: 100)

28. Paraphysis or paraphyses, ramus/rami, aspect: (0) slender (Fig 1I, 32C), (1) robust (Fig 28I). (L:2; ci: 50; ri: 80)

29. Paraphysis or paraphyses, preapical constriction, presence: (0) absent (Figs 10I, 32A,E), (1) present (Figs 1I, 7I)). (L:2; ci: 50; ri: 66)

30. Paraphysis or paraphyses, direction of ramus/rami: (0) posterodorsal (Fig 5I), (1) posteroventral (Fig 1I), (2) horizontal (Fig 28I, 32A). (L:4; ci: 50; ri: 33)

31. Paraphysis or paraphyses, arms, direction: (0) dorsally (Fig 7I), (1) posterodorsally (Figs 1I, 4I, 28I). (L:2; ci: 50; ri: 80)

32. Paraphysis or paraphyses, ramus or rami, curvature: (0) rectilinear (Fig 4I, 28I), (1) slightly curved (Fig 12I), (2) strongly curved (Figs 1I, 7I). (L:7; ci: 28; ri: 44)

33. Aedeagus shaft, direction of curvature: (0) nearly straight, (1) dorsal, (2) ventral (Figs 1G, 4G, 28G). (L:3; ci: 66; ri: 88)

34. Aedeagus, basidorsal margin, aspect: (0) not expanded, (1) expanded. (L:3; ci: 33; ri: 60)

35. Aedeagus, ventral margin, serrated, presence: (0) absent (Figs 1G, 7G, 28G), (1) present (Figs 4G, 10G, 12G, 15G). (L:2; ci: 50; ri: 66)

36. Aedeagus, apical processes/processes, presence: (0) absent (Figs 1G, 2G), (1) present. (L:1; ci: 100; ri: 100)

37. Aedeagus, apical processes/processes, number: (0) one, (1) two. (L:1; ci: 100; ri: 100)

38. Aedeagus, apex, shape: (0) rounded (Figs 1G, 4G, 32C,E), (1) acute, (2) truncated. (L:3; ci: 66; ri: 75)

39. Aedeagus, apical third, aspect: (0) continuing shaft contour, (1) expanded (Fig 10G). (L:3; ci: 33; ri: 66)

40. Female sternite VII, proportion: (0) as long as wide (Fig 3C), (1) longer than wide. (L:1; ci: 100; ri: 100)

41. Female pygofer, apex, aspect: (0) triangular, (1) rounded (Fig 3B). (L:3; ci: 33; ri: 33)

42. Valvifer I, shape: (0) suboval, (1) rounded (Figs 3D, 9D). (L:1; ci: 100; ri: 100)

43. Valvula I of ovipositor, base of VAE, aspect: (0) continuous (Figs 3D, 5D), (1) truncated. (L:2; ci: 50; ri: 50)

44. Valvula I of ovipositor, apical third curvature, aspect: (0) rectilinear or almost rectilinear (Figs 3D, 5D), (1) slightly curved dorsally. (L:3; ci: 33; ri: 60)

45. Valvula I of ovipositor, median third expansion, presence: (0) absent (Fig 5D), (1) present (Fig 3D). (L:4; ci: 25; ri: 40)

46. Valvula I of ovipositor, apical third expansion, presence: (0) absent (Fig 3D), (1) present. (L:1; ci: 100; ri: 100)

47. Valvula I of ovipositor, apical portion, aspect: (0) gradually narrowed towards apex (Fig 3D), (1) abruptly narrowed towards apex. (L:2; ci: 50; ri: 80)

48. Valvula I of ovipositor, dorsal margin sculpting, shape: (0) strigate (Fig 3E), (1) scale-like. (L:2; ci: 50; ri: 66)

49. Valvula II of ovipositor, expansion after basal curvature, aspect: (0) slight (Fig 3F), (1) distinct. (L:1; ci: 100; ri: 100)

50. Valvula II of ovipositor, blade apex, direction: (0) horizontal (Fig 3F), (1) slightly dorsal. (L:1; ci: 100; ri: 100)

51. Valvula II of ovipositor, sclerotized portion, aspect: (0) thin (Fig 3F), (1) large. (L:1; ci: 100; ri: 100)

52. Valvula II of ovipositor, apex, aspect: (0) broad (Fig 3F), (1) narrowed. (L:4; ci: 25; ri: 57)

53. Valvula II of ovipositor, preapical prominence, presence: (0) absent (Fig 3F), (1) present. (L:2; ci: 50; ri: 85)

54. Valvula II of ovipositor, primary teeth anterior margin, denticles, presence: (0) absent (Fig 3F), (1) presence. (L:2; ci: 50; ri: 83)

55. Valvula II of ovipositor, gap between primary teeth, presence: (0) absent (Fig 3F-H), (1) present (Figs 5F-H). (L:3; ci: 33; ri: 66)

56. Valvula II of ovipositor, primary teeth at median portion, shape: (0) triangular (Fig 5F-H), (1) subtriangular (Figs 9F-H), (2) inclined trapezoid. (L:4; ci: 50; ri: 77)

Occurrence map

Fig 34

The most abundant specimens based in our examined material are *C. albolineatus* and *C. platensis*, and they appear to have a wide distribution in Brazil, with some possible patterns as: *C. platensis* appears to be more concentrated in Brazil's east, when *C. albolineatus* appears to be more present in the west. However, this pattern fades when we look further to southern regions of Brazil: *C. platensis* is present along São Paulo State countryside and *C. albolineatus* is well represented in the Paraná's east. Furthermore, we can see a lack of *Ciminius* occurrence in the regions of Amazonian rainforest. This can be explained by the low amount of collection samples from these regions. All *Ciminius* Neotropical species coexist in eastern region of Parana State and for this reason we provided a map in detail for each one.

The genus representants are not commonly collected in traps like malaise or light. From 546 examined materials, we have only one specimen of *C. albolineatus* collected by malaise and three of *C. albolineatus* and four of *C. platensis* collected using light trap.

Parasitism notes

Fig 35

Although the lack of records, nymphs and adults of Cicadellidae are reportedly attacked by Dryinidae, Encyrtidae (Hymenoptera), Pipunculidae (Diptera), Halictophagidae and Helenchidae (Strepsiptera) (Virla 2000, Kathirithamby 2018, Domahovski et al. in prep.). Here, we report adults of *C. albolineatus*, *C. platensis*, *C. yana*, *Ciminus sp. nov. A*, *Ciminus sp. nov. B* and *Ciminus sp. nov. C* specimens parasitized or superparasitized by Strepsiptera. These parasites seem not to prefer male or female, and in some cases, it is possible to notice a reduction or displacement of the host's genital capsule.

Submacroptery report

Fig 36

Approximately 64% of the females of *Ciminius sp. nov. C* collected at Centro Politécnico, Curitiba, Paraná State, presented submacroptery, being the first record to the genus. Submacroptery seems to be a rare feature amongst Cicadellinae and was only reported in *Oragua* Young, 1977 and *Teleogonia* Melichar, 1925 for the Cicadellini tribe and in *Splonia* Signoret, 1851 for Proconiini. Submacroptery definition is when the forewing is somewhat shortened, exposing genital capsule up to one or two segments, with appendix reduced or absent (Zahniser 2021). The females at hand showed a distinct abdominal distention, with the genital capsule exposed which could have been related to parasitism at first, as discussed above. However, not all the females with the supposed distention were parasitized. When further analyzing the specimens, not only the genital capsule was exposed, but the apical cells of the forewing were shortened compared to an average male, implicating in a reduced forewing, which means the submacropteous condition at definition. A total of 133 females of *Ciminus sp. nov. C* were collected from this site, which 85 were submacropterous. No male presented this feature.

4.Discussion

In our analysis, all the genera compounding the outgroup were recovered with high support: *Syncharina* (SR = 97), *Plseiommata* (SR = 99), *Rotigonalia* (SR = 93), *Segonalia* (SR = 98) and *Tylozygus* (SR = 92). *Ciminius* was recovered as monophyletic with a strong support (SR = 94) and being supported by three unambiguous synapomorphies: the forewings with two anteapical cells (10-1) (Figs 1A, 29A), with a plexus of additional R1 veins (14-1) (Fig 29A), and the aedeagus bearing serrated processes in ventral margin (35-1) (Figs 4G, 10G, 12G, 15G), a state that revert to aedeagus without those processes (35-0) in *C. albolineatus* and *C. yana* (Figs 1G, 7G). This clade was also supported by three homoplastic characters: pronotum with a median reentrance in posterior margin (8-1) (Fig 1A), shared with the genera *Syncharina* and *Plesiommata*; the forewing with outer anteapical cell opened basally (13-1) (Fig 29A), a condition also appearing in *Chlorogonalia*, and the aedeagus with basidorsal margin expanded (34-1) (Figs 1G, 4G, 7G, 10G, 12G), a feature shared with *Plesiommata molicella*, but absent in *Ciminus sp. nov. C* (Fig 15G).

The new Genus A shares external and internal features with both *Tylozygus* and *Ciminius*. The combination of stem articulated with connective arms (Figs 32D, F), the presence of a paraphysis with arms and ramus articulated (Figs 32C, E), the aedeagus expanded in apical third (Figs 1G, 28G), the presence of short abdominal apodemes (Fig 30B) and the presence of a pair of dark rounded macula behind ocelli (Fig. 1A, 28A) suggest the inclusion of this new species in *Ciminius*, but due to the forewing venation, presenting not only two (Fig 29A), but three anteapical cells (Fig 28B), that placement was discarded. Also, for presenting a paraphysis – one ramus – (Fig 28I), not a paraphyses – two rami – as in *Tylozygus* (Fig 32C), and strong differences in the shape of the head and in the overall coloration, the placement in *Tylozygus* can be promptly discarded too. Our analysis recovered the *New Genus A sp. nov. D* as sister of *Ciminius*, with a high support (SR = 85), with one synapomorphy: the crown bearing a rounded dark macula behind the ocelli (3-1) and other five homoplastic characters (Fig 1A, 28A). Based on the differences between *Ciminius* and this new species, we propose a new genus to include the new species D.

Tylozygus was recovered as sister of the clade *Ciminius* + *New Genus A*, with low support (SR = 37) besides their two unambiguous synapomorphies: stem of connective articulated with connective arms (24-1) (Fig 32C-F) and rounded shaped valvifer 1 (42-1) (Fig 17D). The peculiarity of having the connective stem articulated as a separate sclerite only appears in these three genera, resulting not only in a synapomorphy on this analysis, but in a diagnostic feature for this clade amongst all Cicadellini genera. For this reason, this clade was nominated here as Articulated Stem Clade.

The *Ciminius* internal relationships are mostly defined by the male genitalia features, once all the species have external morphology strongly conserved. *Ciminius sp. nov. B* was recovered as sister of the remaining *Ciminius*. This relationship was supported by one homoplastic character: paraphysis directed posteroventrally (30-1) (Fig. 12I), a condition shared also with *C. albolineatus* (Fig 1I) and *C. yana* (Fig 7I). The remaining *Ciminius* are composed by two clades: *C. platensis* + *Ciminus sp. nov. C* and *Ciminus sp. nov. A* + (*C. albolineatus* + *C. yana*), recovered with very low support (SR = 3) and two homoplastic characters: ground color of body pale-yellow or brown (1-1), curvature of paraphysis ramus rectilinear (32-0), the latter being reverted to (32-2) strongly curved in the *C. albolineatus* + *C. yana* Clade. *Ciminius platensis* + *Ciminus sp. nov. C* are weakly supported as sisters (SR = 34), sharing one homoplasy, the valvule II of ovipositor bearing gaps between primary teeth (55-1) (Figs 6F-H, 17F-H). This character occurred independently,

appearing only in these two *Ciminius* representants, plus in *Chlorogonalia cuoleovittata, Syncharina punctatissima*, *Syncharina argentina*, and *Plesiommata molicella* from the outgroup. The remaining clade recovered *Ciminius sp. nov. A* as sister to *C. albolineatus* + *C. yana*, with very low support (SR = 4) and a single homoplastic characteristic: preapical constriction in ventral margin of paraphysis (29 – 1) (Figs 1I, 7I, 10I), a feature shared with *New genus A sp. nov. D* (Fig 28I). *C. albolineatus* and *C. yana* were recovered as sisters with strong support (SR = 85), and four homoplastic characters: paraphysis directed posteroventrally (30-1) and strongly curved (32-2) (Figs 1I, 7I), aedeagus without serrated processes in ventral margin (35-0) and without preapical expansion (39-0) (Figs 1G, 7G). In the Articulated Stem Clade, the most taxonomically informative character is the paraphysis/paraphyses aspect of rami/ramus, which firstly appeared slightly curved in *Tylozygus geometricus* (Fig. 32C), *T. fasciatus*, *New genus A nov. sp. D* (Fig. 28I), and *Ciminius sp. nov. B* (Fig. 10I), straight in *C. platensis* (Fig. 5I), *Ciminus sp. nov. C* (Fig. 15I) and *Ciminus sp. nov. A* (Fig. 10I), and lastly, strongly curved in *C. albolineatus* (Fig. 1I) and *C. yana* (Fig. 7I).

Ciminius are collected in open fields with a predominance of native grasses, but they are very abundant in environments with a strong degree of anthropomorphism, such as lawns planted for landscaping purposes and pastures for cattle breeding. Although their probable original habitat is native fields, their distribution may be undergoing intense interference due to human activity, as forests are cleared to make way for residential and agricultural areas, where Ciminius species can survive. As for example, *Ciminus sp. nov. A* and *Ciminus sp. nov. B* were collected in conserved sites, being known only from the Parque Estadual de Vila Velha, until the present moment. *Ciminius sp. nov. C* was collected in two sites: in the grasses of Centro Politécnico, Universidade Federal do Paraná, where our laboratory is located, and in grasses of the holotype collector, Alexandre Domahovski's farmstead. According to Domahovski's personal observation, the surroundings of the farmstead were unfortunately damaged, and recently we recorded specimens of *C. albolineatus* in the site. The specimen of *C. yana* was collected in a high conservation site, Reserva Particular do Patrimônio Natural da Guaricica, in Paraná, but this species does not occur only in native vegetation because it was abundantly collected in pasture areas in the countryside of São Paulo State.

The only two specimens of *New genus A* were collected in grasses where our laboratory is located. Due to its rarity, we hypothesized that these specimens could occur not in grasses, but in bushes,

since it is *Tylozygus* habitat. As mentioned above, the collection site presents a remainder of a native Atlantic Forest, but Cicadellidae collections, in both bushes and open field grasses, have been made in the last ten years, and only now a representative of this genus appeared, confirming its rarity.

The species *Ciminius callosa* (Ball, 1926) was described based on a female from Bolivia (Fig. 20), and in the original description work, a male paratype of Bahia, Brazil was designed, based only in external features. It is not safe to designate an allotype to a female holotype by this far distance and summarized with the environment differences between the areas and the overall similar aspects between *Ciminius* species, we do not consider these paratype specimen. Also, the female was collected in Puerto Suárez, a city located near to Mato Grosso do Sul state boundaries. Under our studied material, mostly of the specimens from Mato Grosso do Sul belongs to *C. platensis*, but we must consider that *C. yana* type was described from Porto Murtinho, a city of Mato Grosso do Sul state. The original description of *C. callosa* consists in color, external morphology and male and female external genitalia, the latter with illustrations. In comparison with the other *Ciminius* representants, we cannot identify a specimen of *C. callosa* by the original description, either in coloration, female sternite VII or male genital capsule. Unfortunately, due to the coexistence of species in the same collection sites, we are not able to confirm the synonym of *C. callosa* and *C. platensis*.

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CONCLUSÃO GERAL

Após o nosso trabalho, a diversidade de *Ciminius* aumentou de 7 para 10 espécies, sendo que 6 delas ocorrem na Região Neotropical e estão registradas no Brasil. Um estudo mais detalhado da distribuição associada à filogenia pode ser realizado com espécimes da Região Neártica, de forma a analisar variações de cor e genitália, excluindo a possibilidade de erros taxonômicos, como espécies duplicadas ou sinônimos errôneos. Alguns fatos devem ser considerados devido à descoberta de três novas espécies do gênero: a eminente alta diversidade na região neotropical, especialmente no Brasil para o grupo Cicadellini, que é comumente coletado, mas pouco estudado e muitas vezes subestimado; a variação na coloração e a coexistência dos espécimes exigem atenção na identificação, com as características diagnósticas sempre incluindo caracteres da genitália masculina.

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FIGURAS

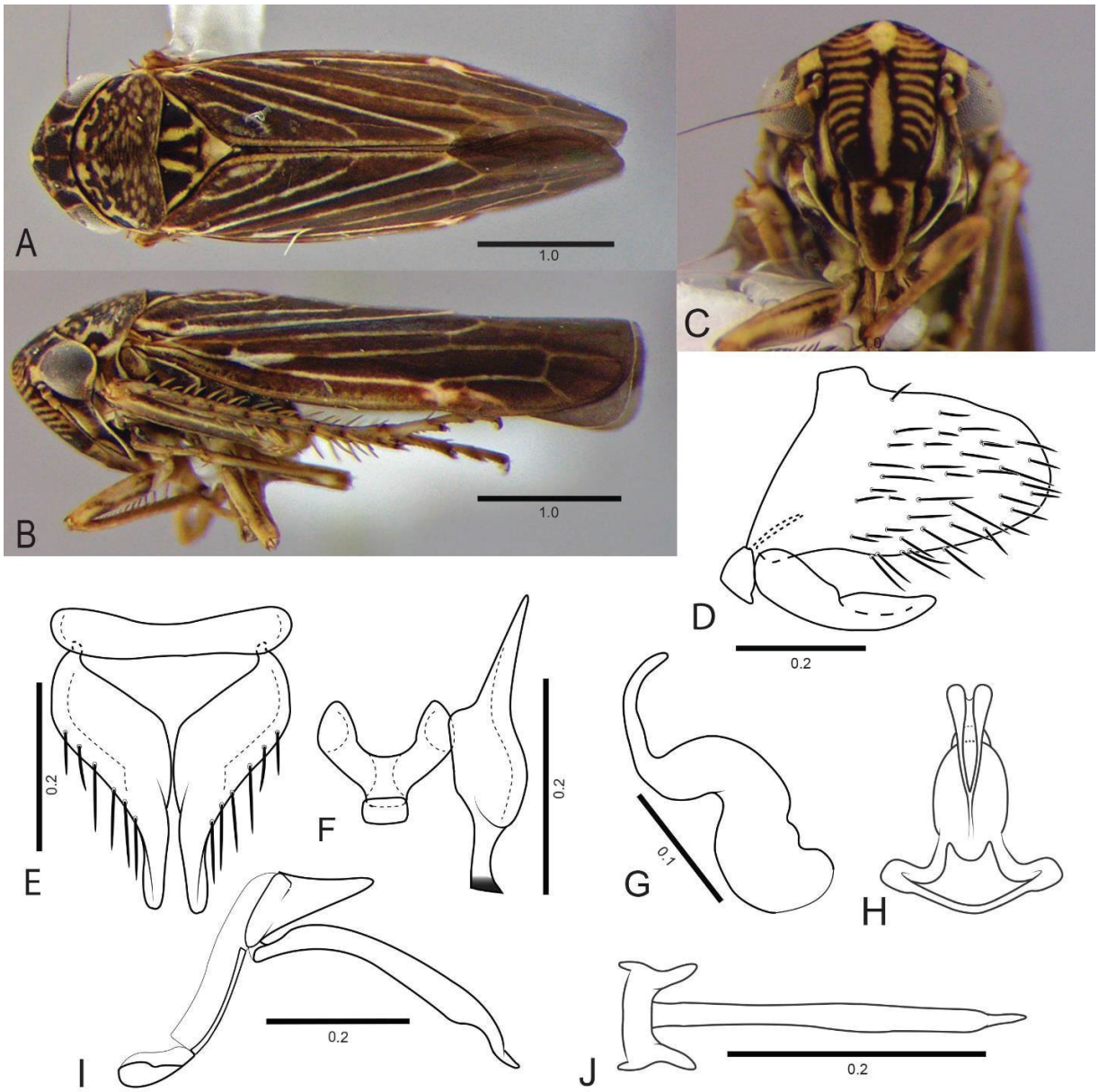

Figure 1. *Ciminius albolineatus*, male. **A** habitus, dorsal view. **B** habitus, lateral view. **C** head, frontal view. **D** pygofer, valve and subgenital plate, lateral view. **E** valve and subgenital plates, ventral view. **F** connective and style, ventral view. **G** aedeagus, lateral view. **H** aedeagus, caudoventral view. **I** connective, stem and paraphysis, lateral view. **J** paraphysis, dorsal view. Scale bars in mm.

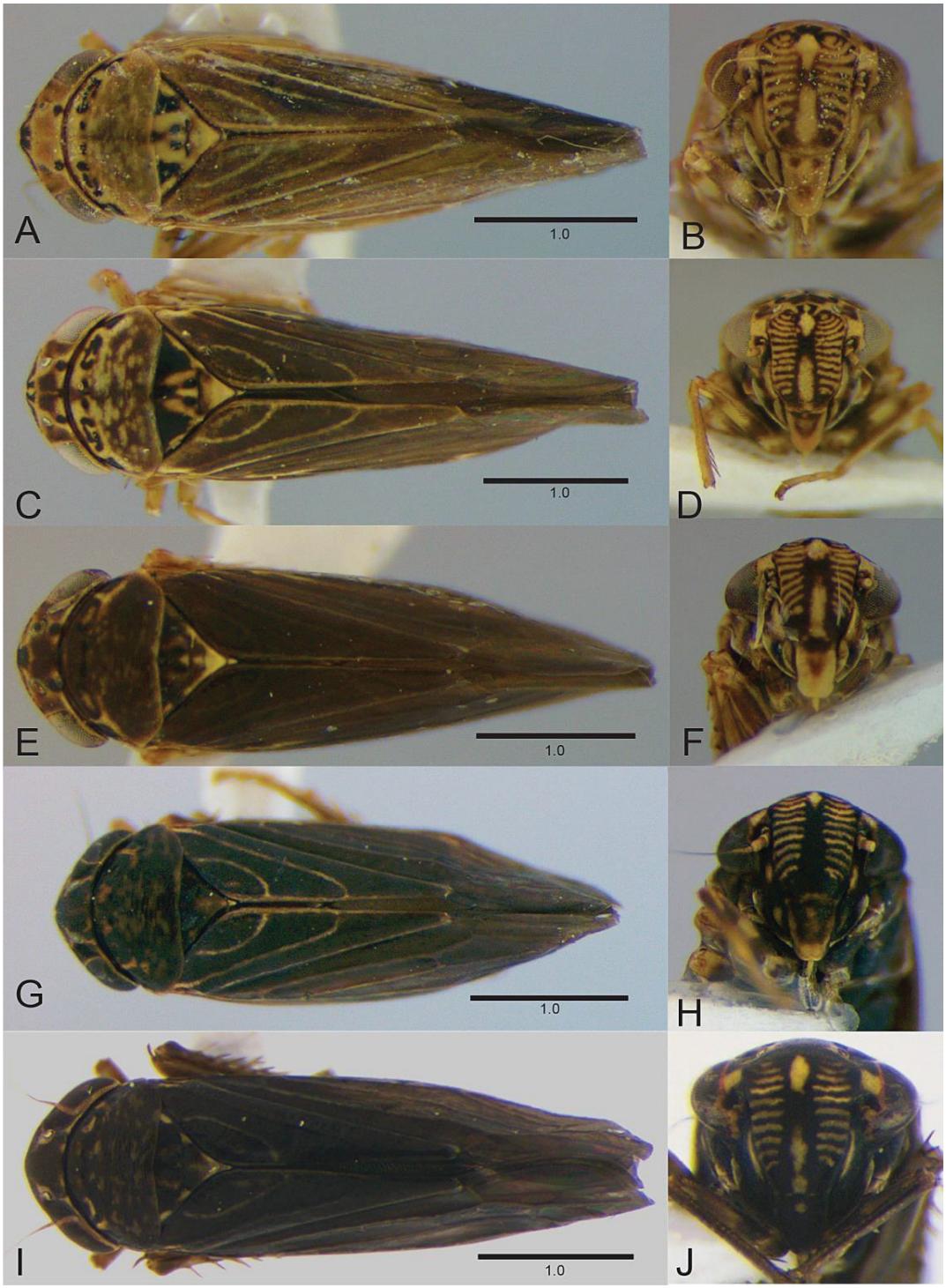

Figure 2. *Ciminius albolineatus* color variation in males, habitus in dorsal and frontal view, respectively. **A-B** specimen from Mato Grosso. **C-D** specimen from Goiás. **E-F** specimen from Rondônia. **G-H** specimen from Paraná. **I-J** specimen of Paraná. Scale Scale bars in mm

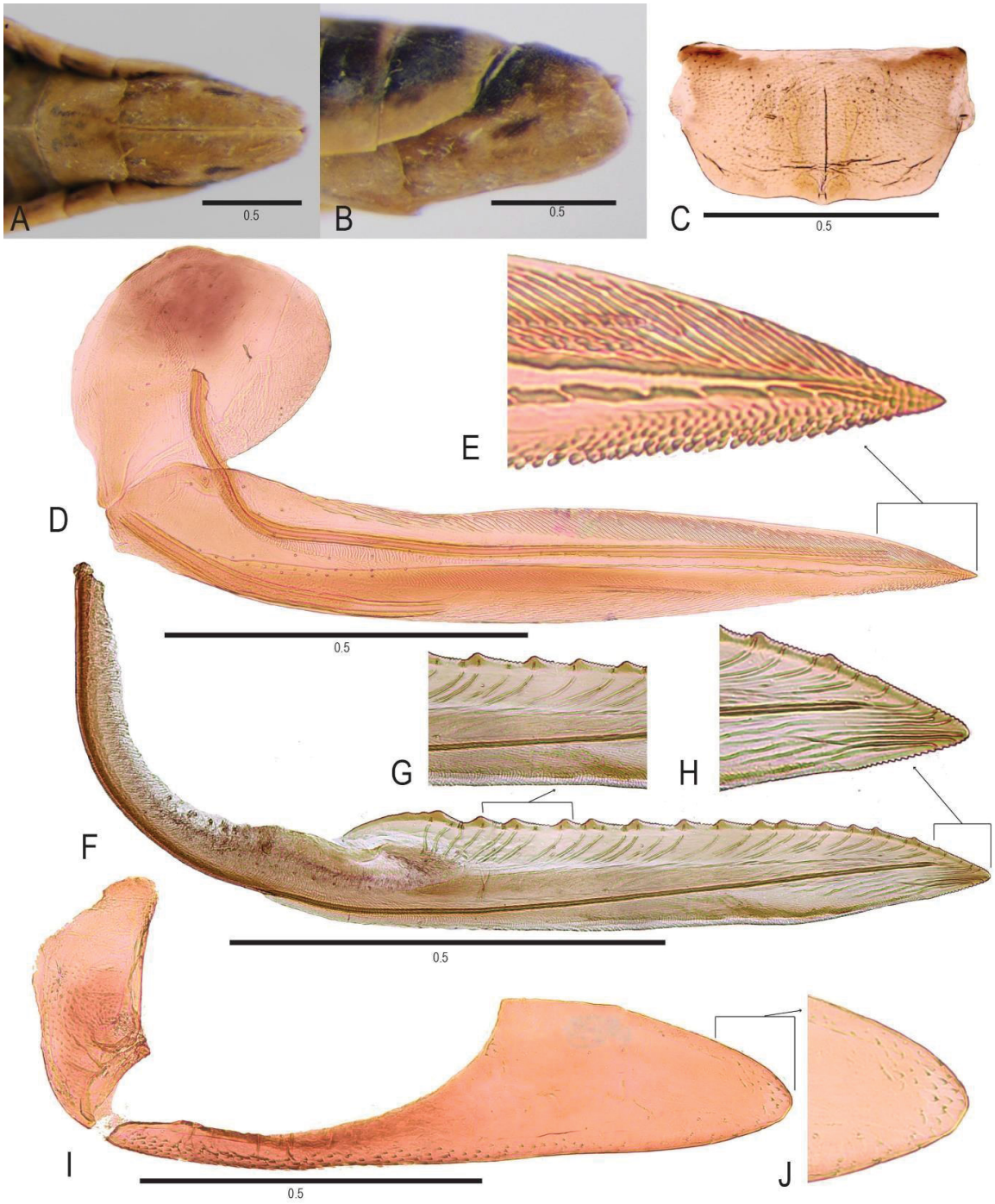

Figure 3. *Ciminius albolineatus*, female. **A** distal portion of abdomen, ventral view. **B** distal portion of abdomen, lateral view. **C** Sternite VII, ventral view. **D** first valvifer and first valvula, lateral view. **E** apical portion of first valvula. **F** second valvula, lateral view. **G** median portion of second valvula **H** apical portion of second valvula. **I** second valvifer and gonoplac, lateral view. **J** apical portion of gonoplac. Scale bars in mm.

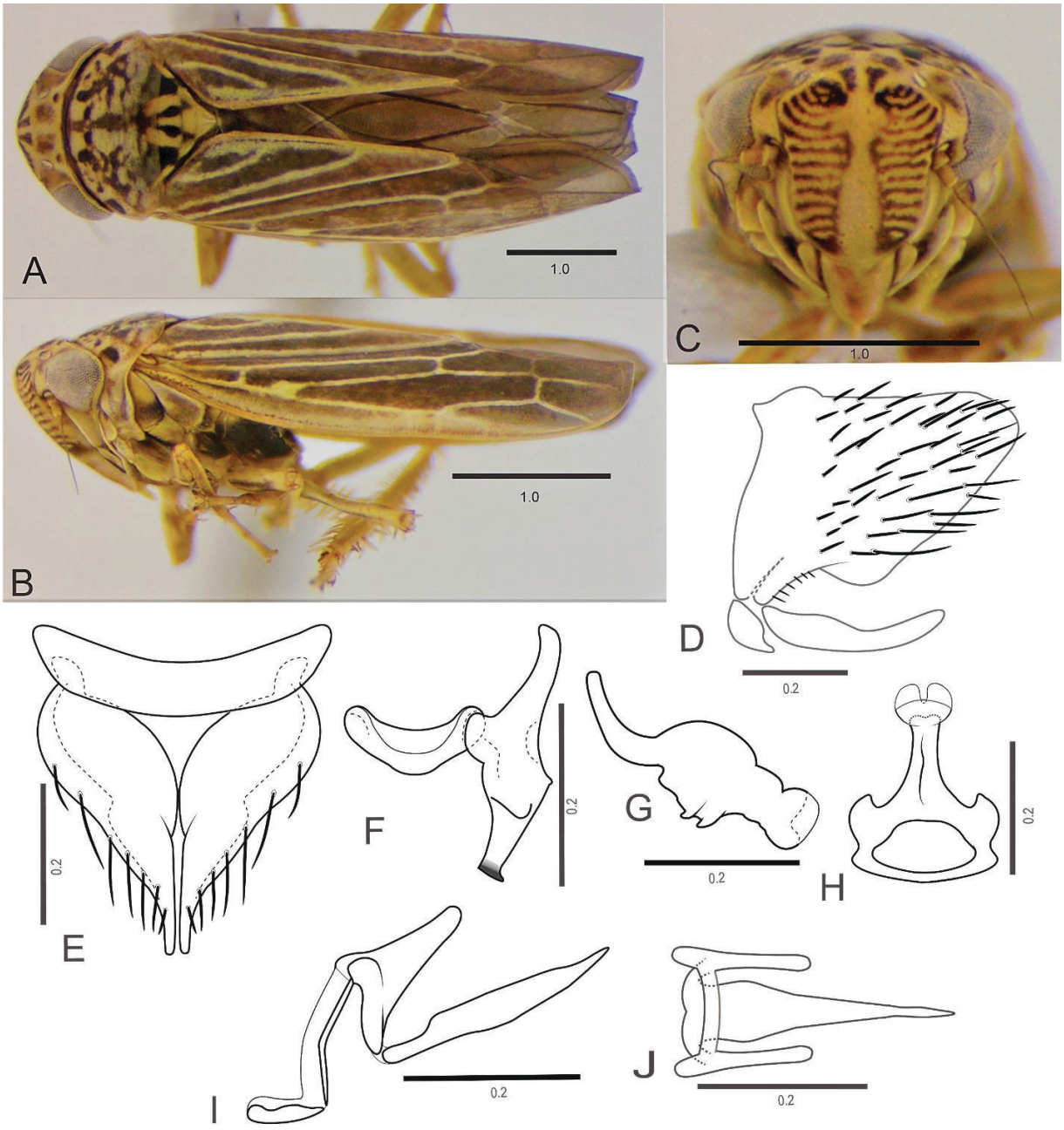

Figure 4. *Ciminius platensis*, male. **A** habitus, dorsal view. **B** habitus, lateral view. **C** head, frontal view. **D** pygofer, valve and subgenital plate, lateral view. **E** valve and subgenital plates, ventral view. **F** connective and style, ventral view. **G** aedeagus, lateral view. **H** aedeagus, caudoventral view. **I** connective, stem and paraphysis, lateral view. **J** paraphysis, dorsal view. Scale bars in mm.

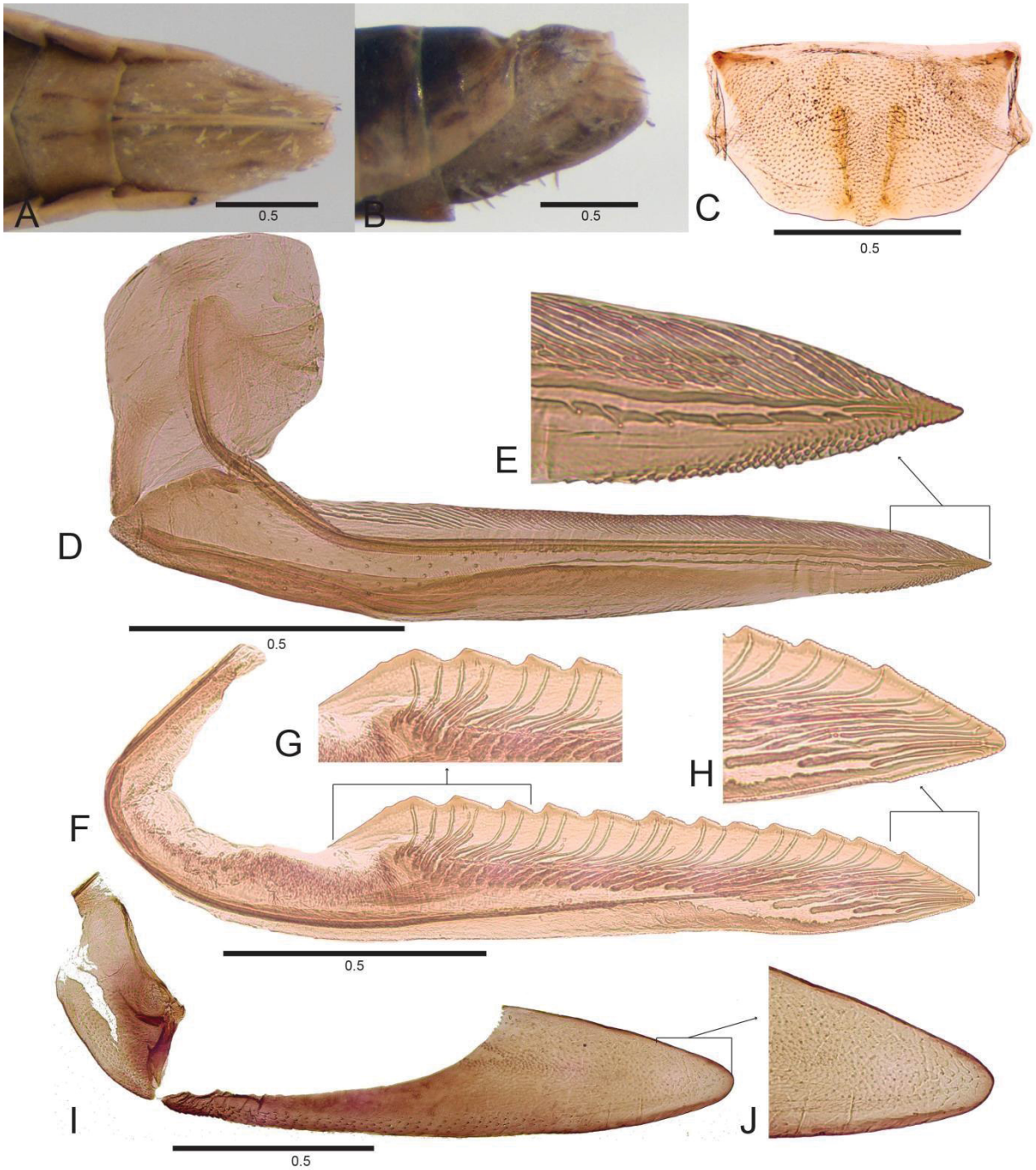

Figure 5. *Ciminius platensis*, female. **A** distal portion of abdomen, ventral view. **B** distal portion of abdomen, lateral view. **C** Sternite VII, ventral view. **D** first valvifer and first valvula, lateral view. **E** apical portion of first valvula. **F** second valvula, lateral view. **G** median portion of second valvula **H** apical portion of second valvula. **I** second valvifer and gonoplac, lateral view. **J** apical portion of gonoplac. Scale bars in mm.

Figure 6. *Ciminius yana*, male holotype.

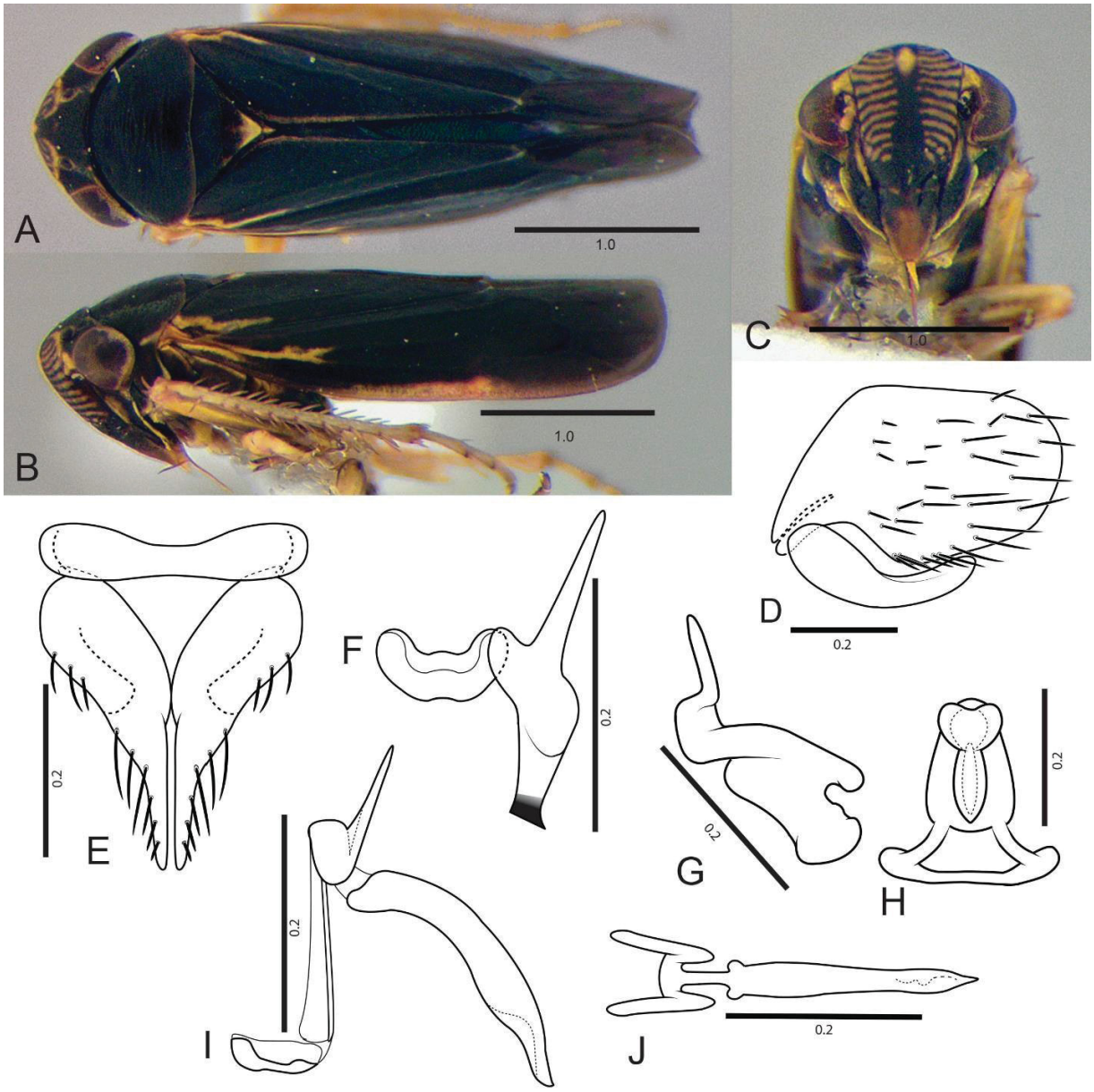

Figure 7. *Ciminius yana*, male **A** habitus, dorsal view. **B** habitus, lateral view. **C** head, frontal view. **D** pygofer, valve and subgenital plate, lateral view. **E** valve and subgenital plates, ventral view. **F** connective and style, ventral view. **G** aedeagus, lateral view. **H** aedeagus, caudoventral view. **I** connective, stem and paraphysis, lateral view. **J** paraphysis, dorsal view. Scale bars in mm.

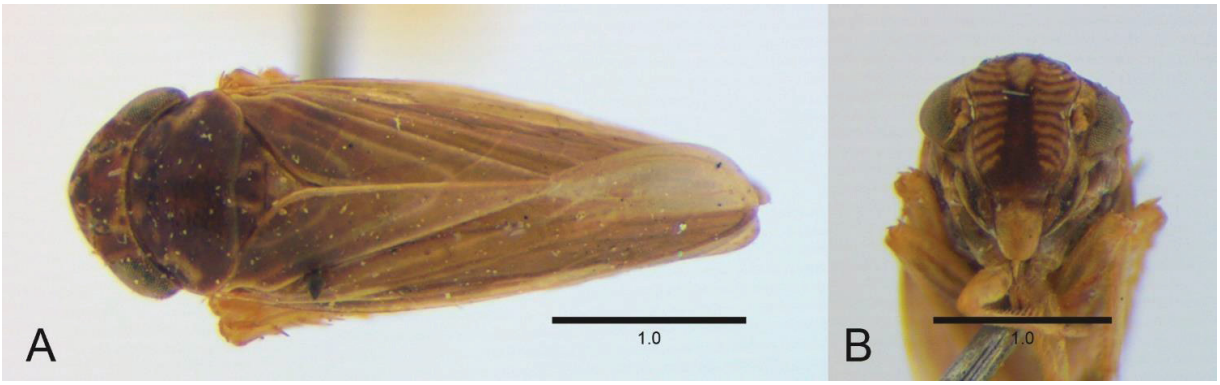

Figure 8. *Ciminius yana*, color variation in male, habitus. **A** dorsal view. **B** frontal view. Scale bars in mm.

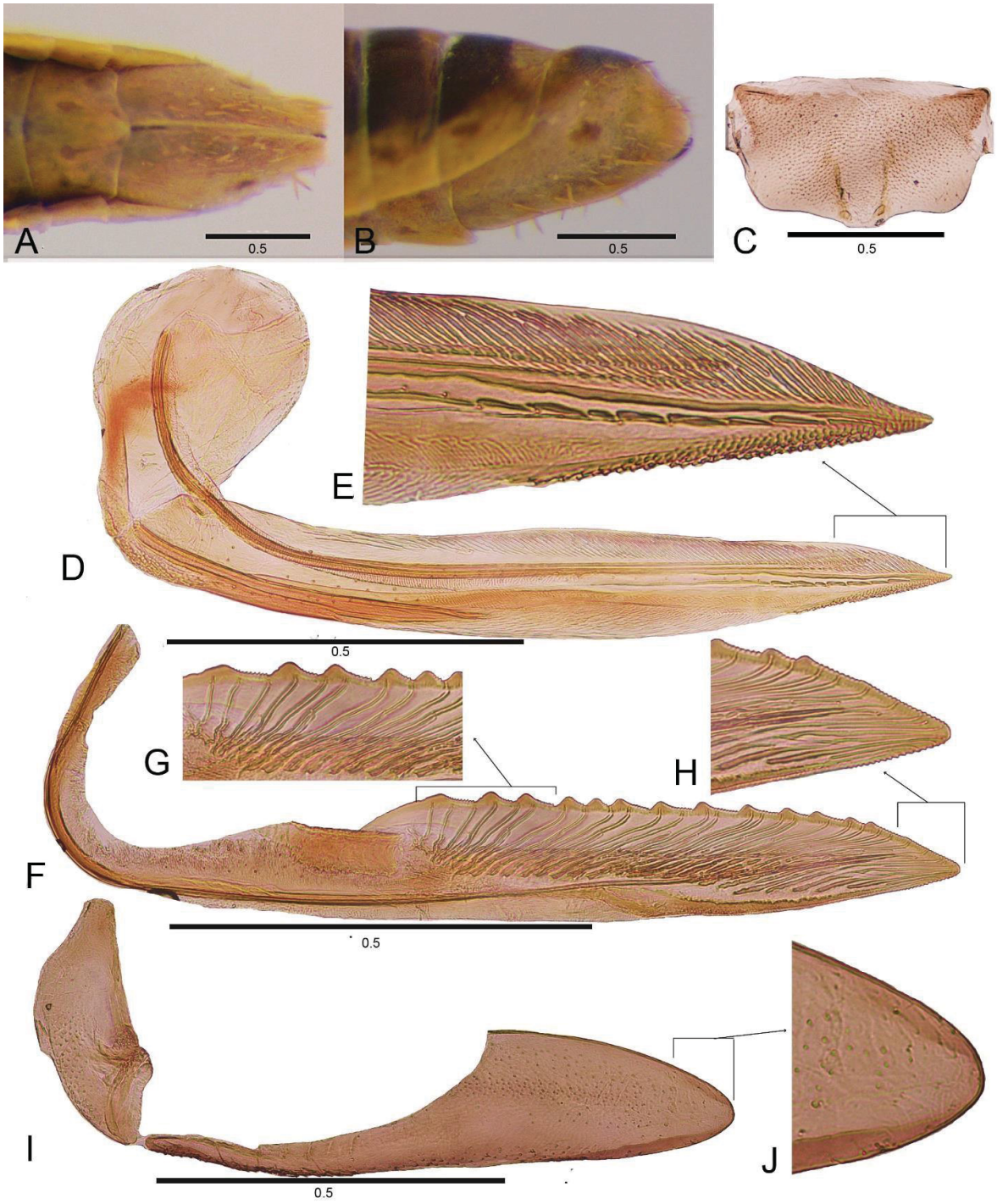

Figure 9. *Ciminius yana*, female. **A** distal portion of abdomen, ventral view. **B** distal portion of abdomen, lateral view. **C** Sternite VII, ventral view. **D** first valvifer and first valvula, lateral view. **E** apical portion of first valvula. **F** second valvula, lateral view. **G** median portion of second valvula **H** apical portion of second valvula. **I** second valvifer and gonoplac, lateral view. **J** apical portion of gonoplac. Scale bars in mm.

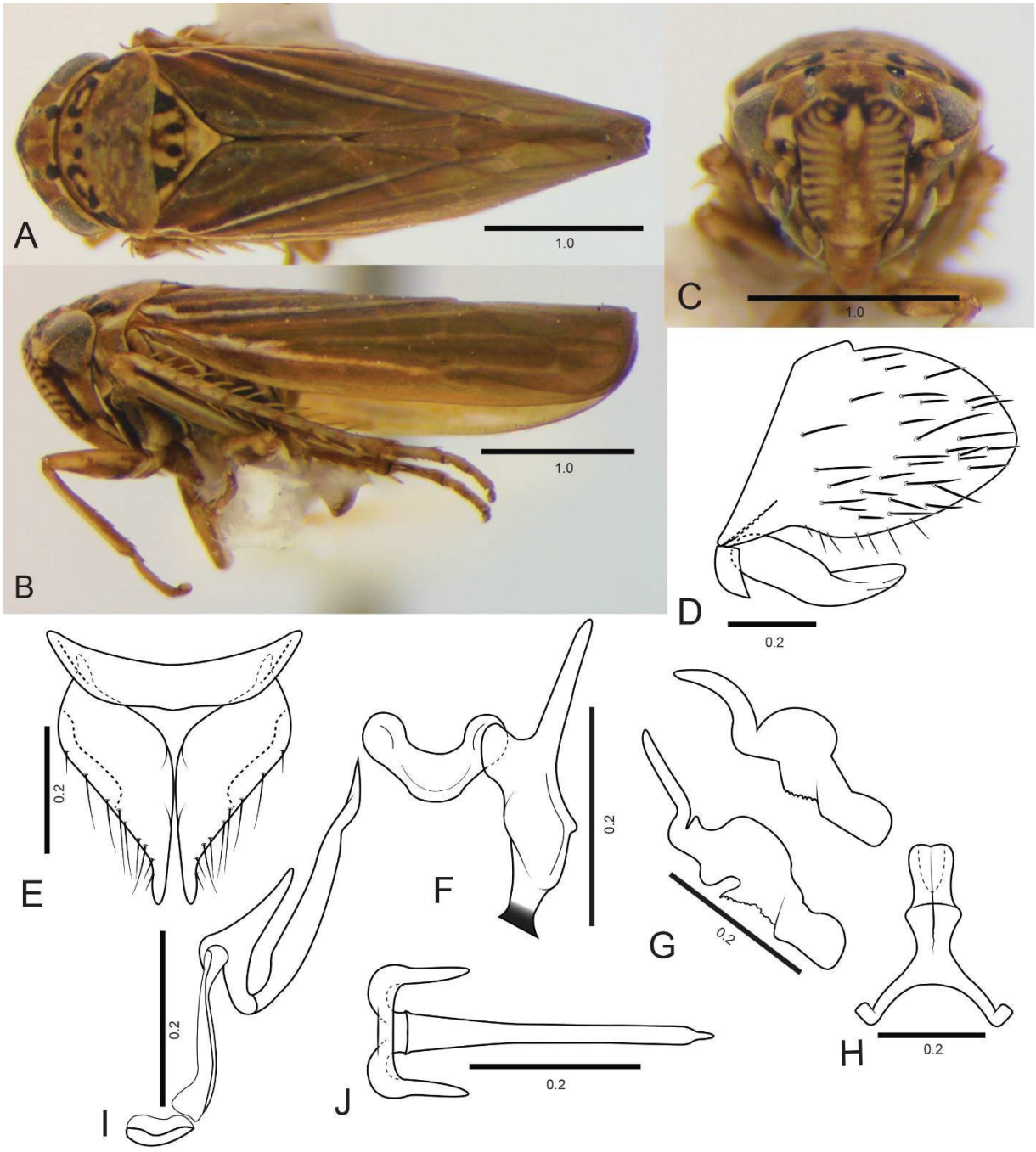

Figure 10. *Ciminius sp. nov. A*, male holotype. **A** habitus, dorsal view. **B** habitus, lateral view. **C** head, frontal view. **D** pygofer, valve and subgenital plate, lateral view. **E** valve and subgenital plates, ventral view. **F** connective and style, ventral view. **G** aedeagus, lateral view. **H** aedeagus, caudoventral view. **I** connective, stem and paraphysis, lateral view. **J** paraphysis, dorsal view. Scale bars in mm.

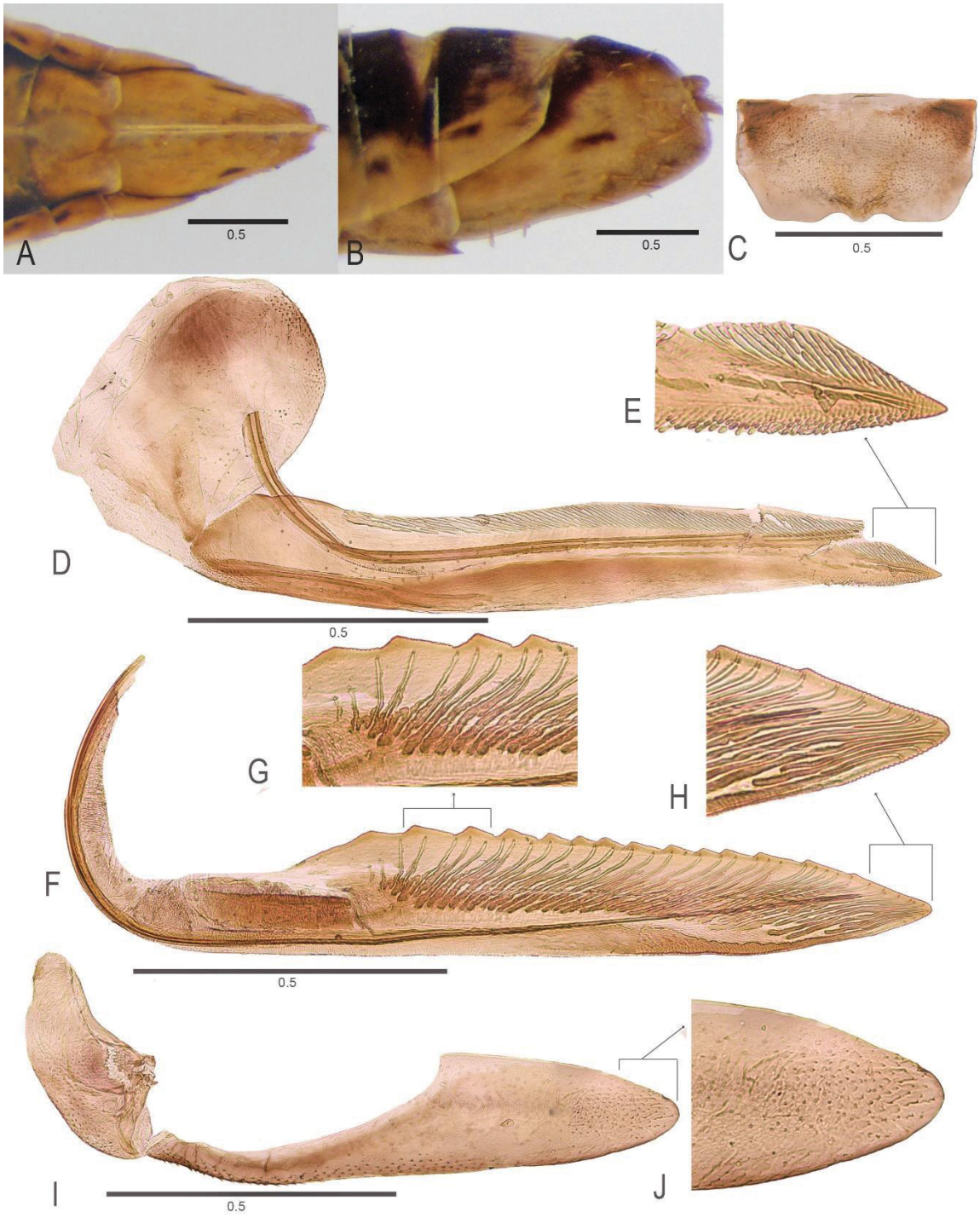

Figure 11. *Ciminius sp. nov. A,* female paratype. **A** distal portion of abdomen, ventral view. **B** distal portion of abdomen, lateral view. **C** Sternite VII, ventral view. **D** first valvifer and first valvula, lateral view. **E** apical portion of first valvula. **F** second valvula, lateral view. **G** median portion of second valvula **H** apical portion of second valvula. **I** second valvifer and gonoplac, lateral view. **J** apical portion of gonoplac. Scale bars in mm.

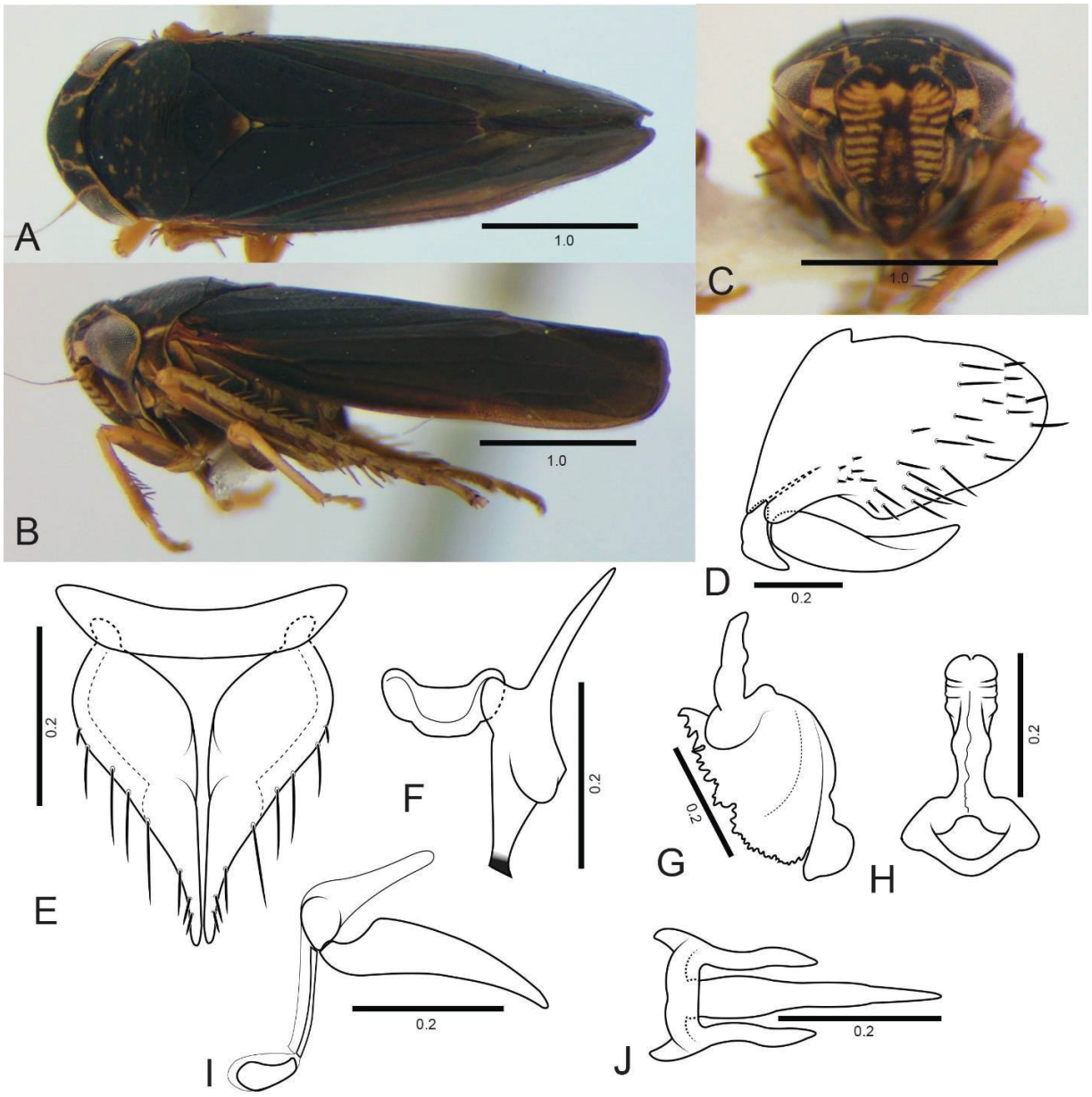

Figure 12. *Ciminius sp. nov. B*, male holotype. **A** habitus, dorsal view. **B** habitus, lateral view. **C** head, frontal view. **D** pygofer, valve and subgenital plate, lateral view. **E** valve and subgenital plates, ventral view. **F** connective and style, ventral view. **G** aedeagus, lateral view. **H** aedeagus, caudoventral view. **I** connective, stem and paraphysis, lateral view. **J** paraphysis, dorsal view. Scale bars in mm.

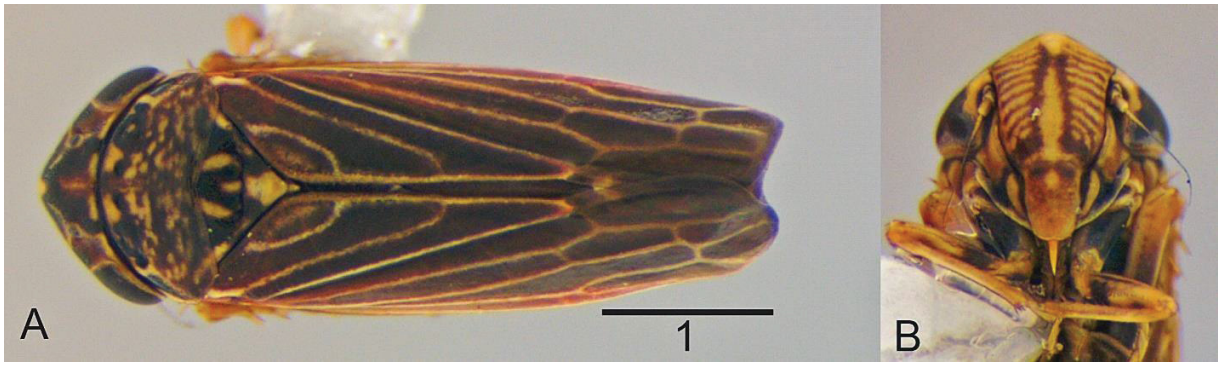

Figure 13. *Ciminius* s*p. nov. B,* color variation in male, habitus. **A** dorsal view. **B** frontal view. Scale bars in mm.

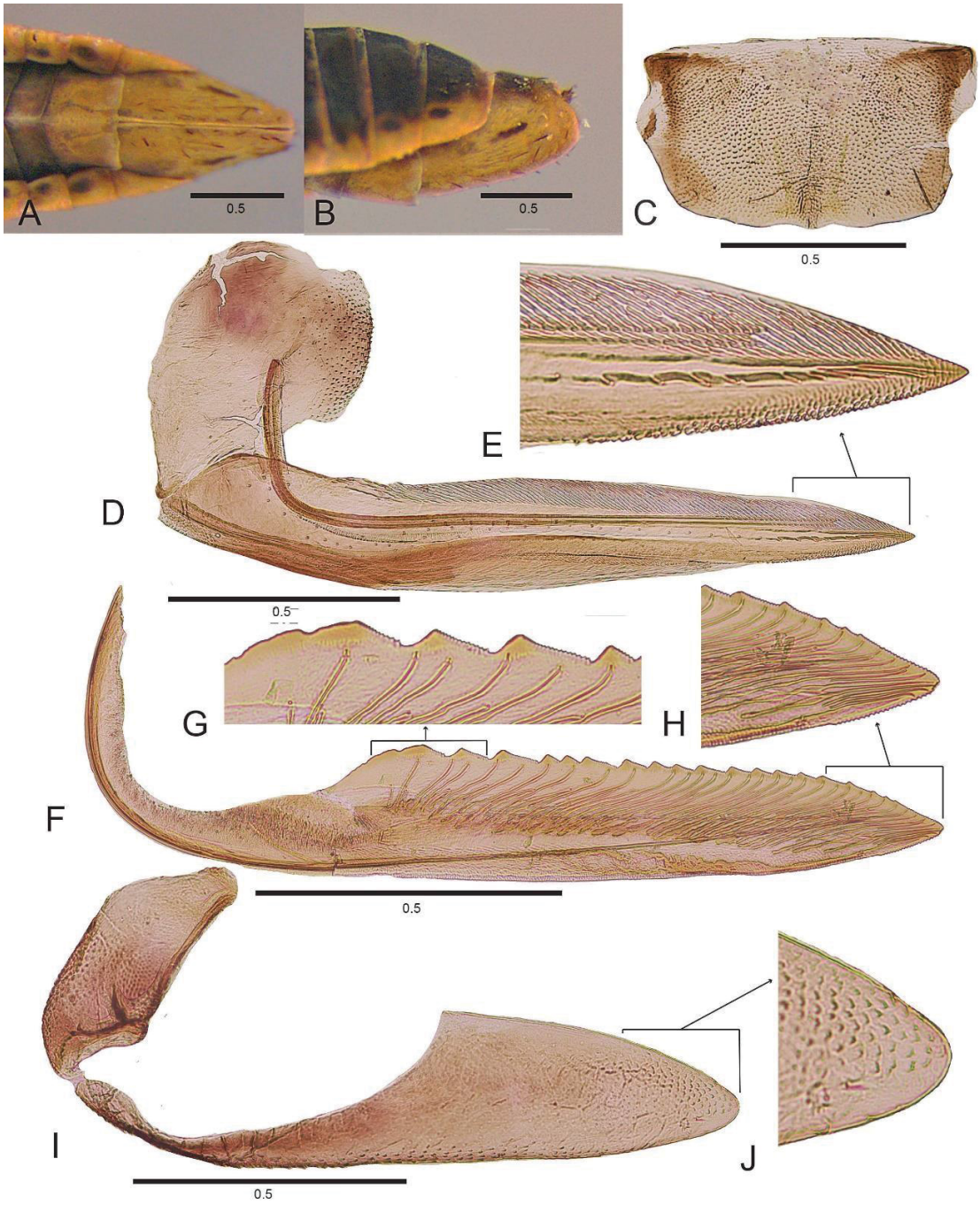

Figure 14. *Ciminius sp nov. B*, female paratype. **A** distal portion of abdomen, ventral view. **B** distal portion of abdomen, lateral view. **C** Sternite VII, ventral view. **D** first valvifer and first valvula, lateral view. **E** apical portion of first valvula. **F** second valvula, lateral view. **G** median portion of second valvula **H** apical portion of second valvula. **I** second valvifer and gonoplac, lateral view. **J** apical portion of gonoplac. Scale bars in mm.

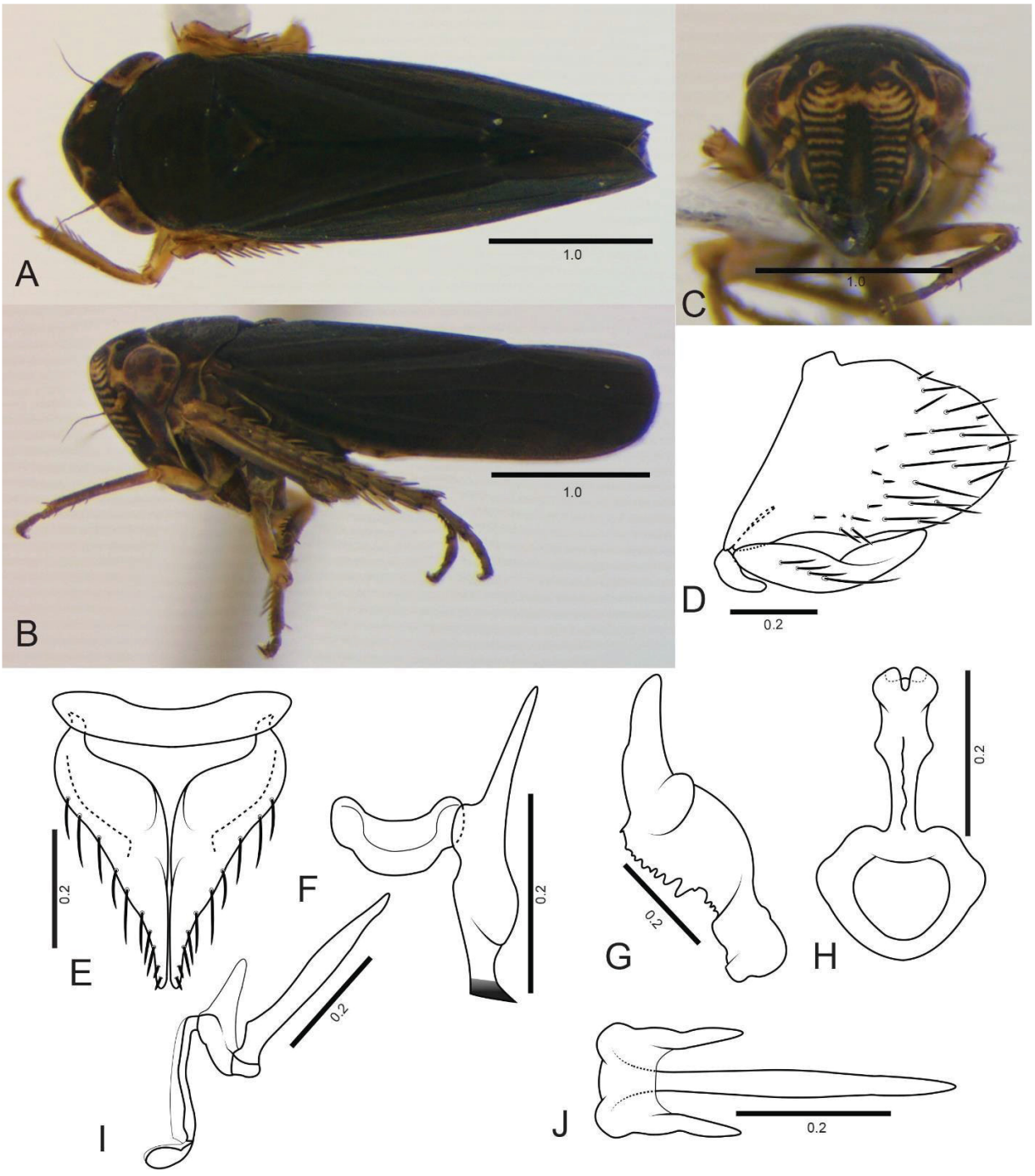

Figure 15. *Ciminius* sp. *nov. C***,** male holotype. **A** habitus, dorsal view. **B** habitus, lateral view. **C** head, frontal view. **D** pygofer, valve and subgenital plate, lateral view. **E** valve and subgenital plates, ventral view. **F** connective and style, ventral view. **G** aedeagus, lateral view. **H** aedeagus, caudoventral view. **I** connective, stem and paraphysis, lateral view. **J** paraphysis, dorsal view. Scale bars in mm.

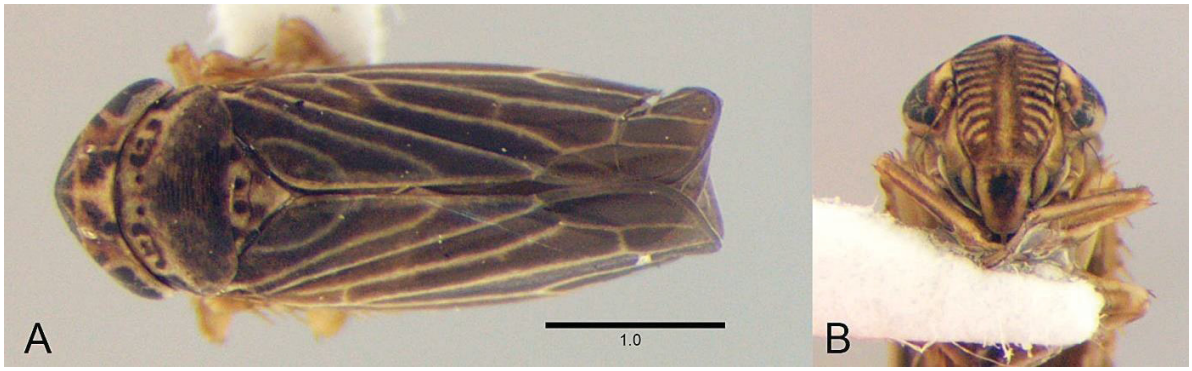

Figure 16. *Ciminius sp. nov. C,* color variation in male, habitus. **A** dorsal view. **B** frontal view.

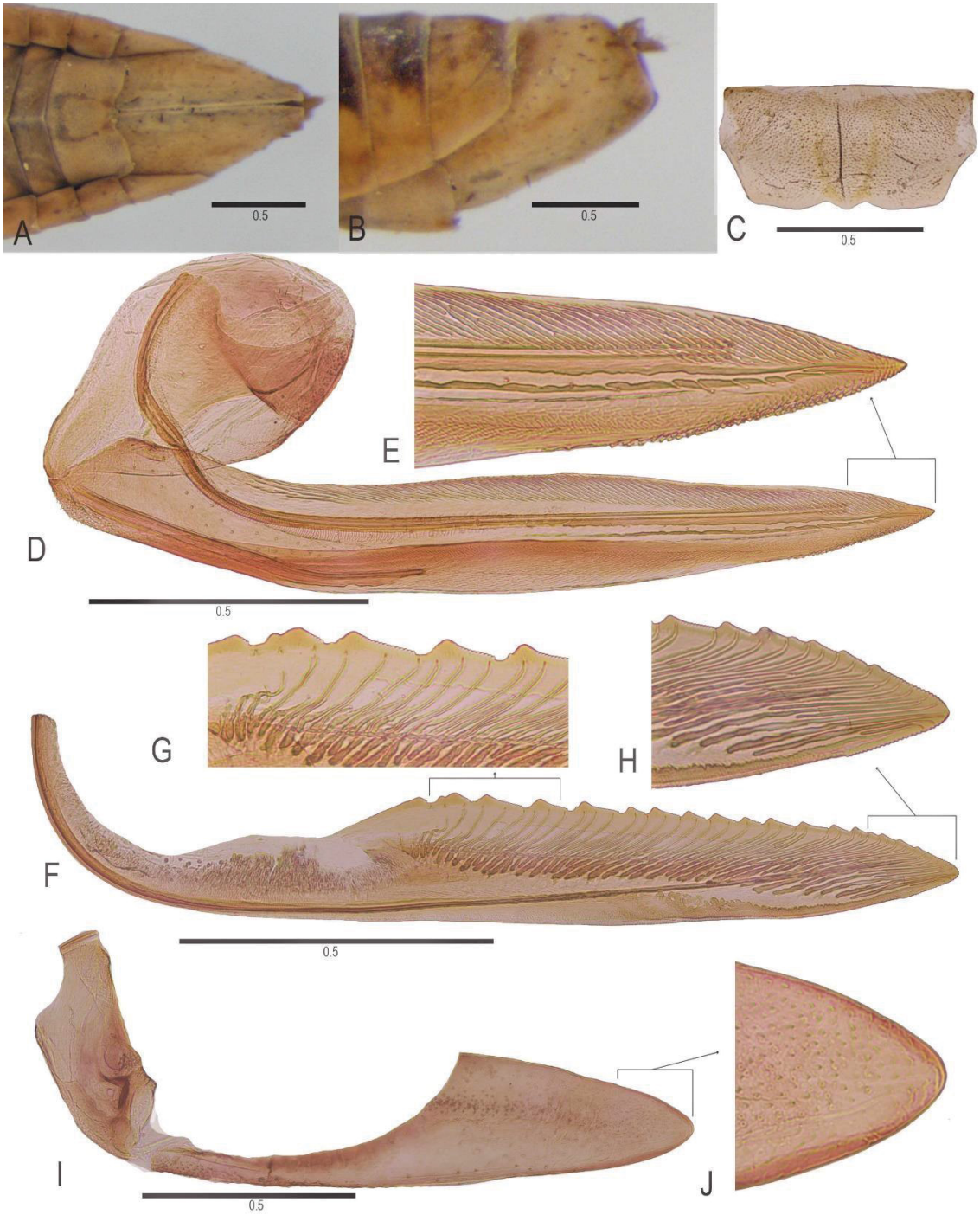

Figure 17. *Ciminius sp. nov. C,* female paratype. **A** distal portion of abdomen, ventral view. **B** distal portion of abdomen, lateral view. **C** Sternite VII, ventral view. **D** first valvifer and first valvula, lateral view. **E** apical portion of first valvula. **F** second valvula, lateral view. **G** median portion of second valvula **H** apical portion of second valvula. **I** second valvifer and gonoplac, lateral view. **J** apical portion of gonoplac. Scale bars in mm.

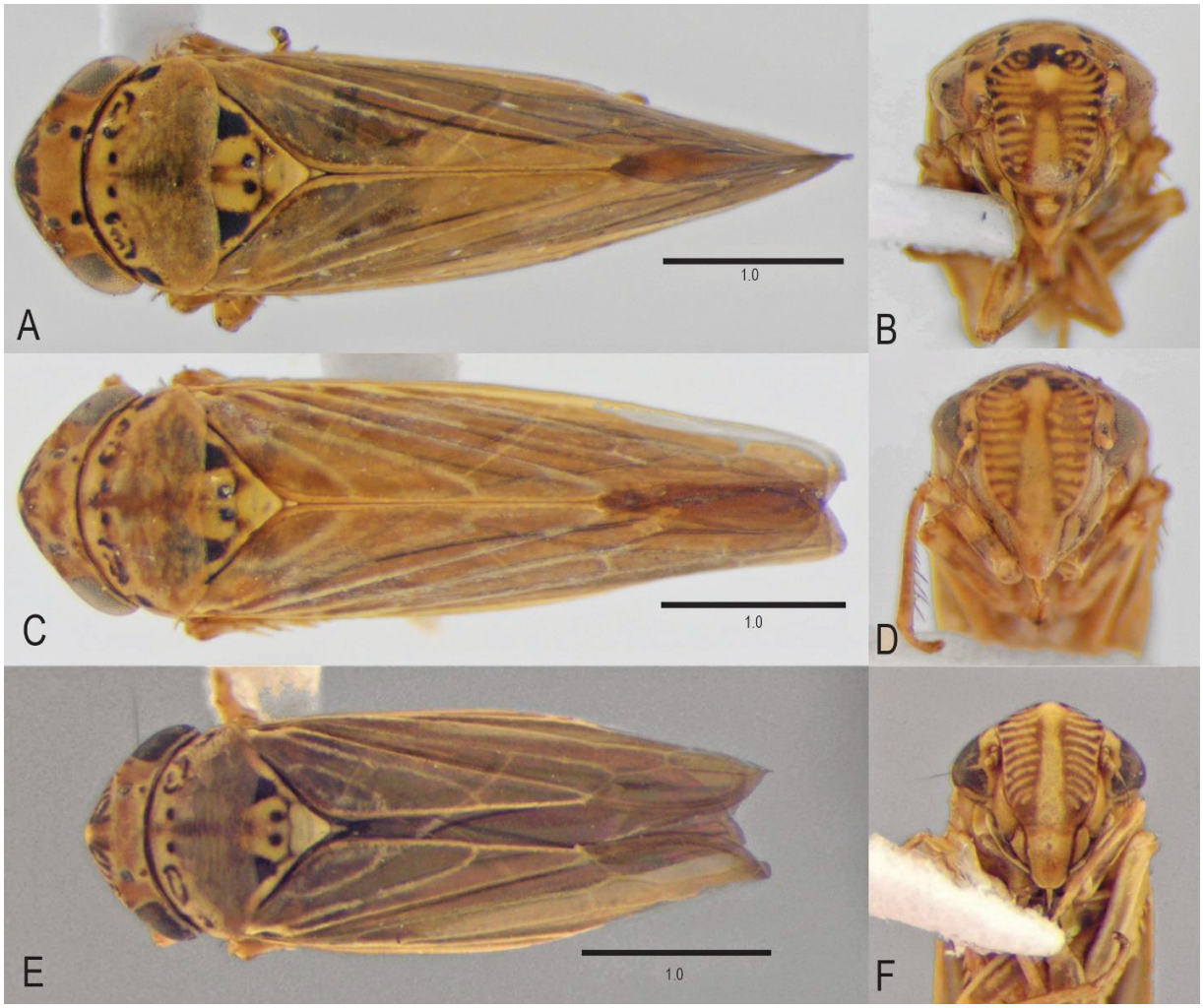

Figure 18. *Ciminius* females habitus, dorsal and frontal view, respectively. **A-B** *C. albolineatus*. **C-D** *C. platensis.* **E-F** *C. yana.* Scale bars in mm.

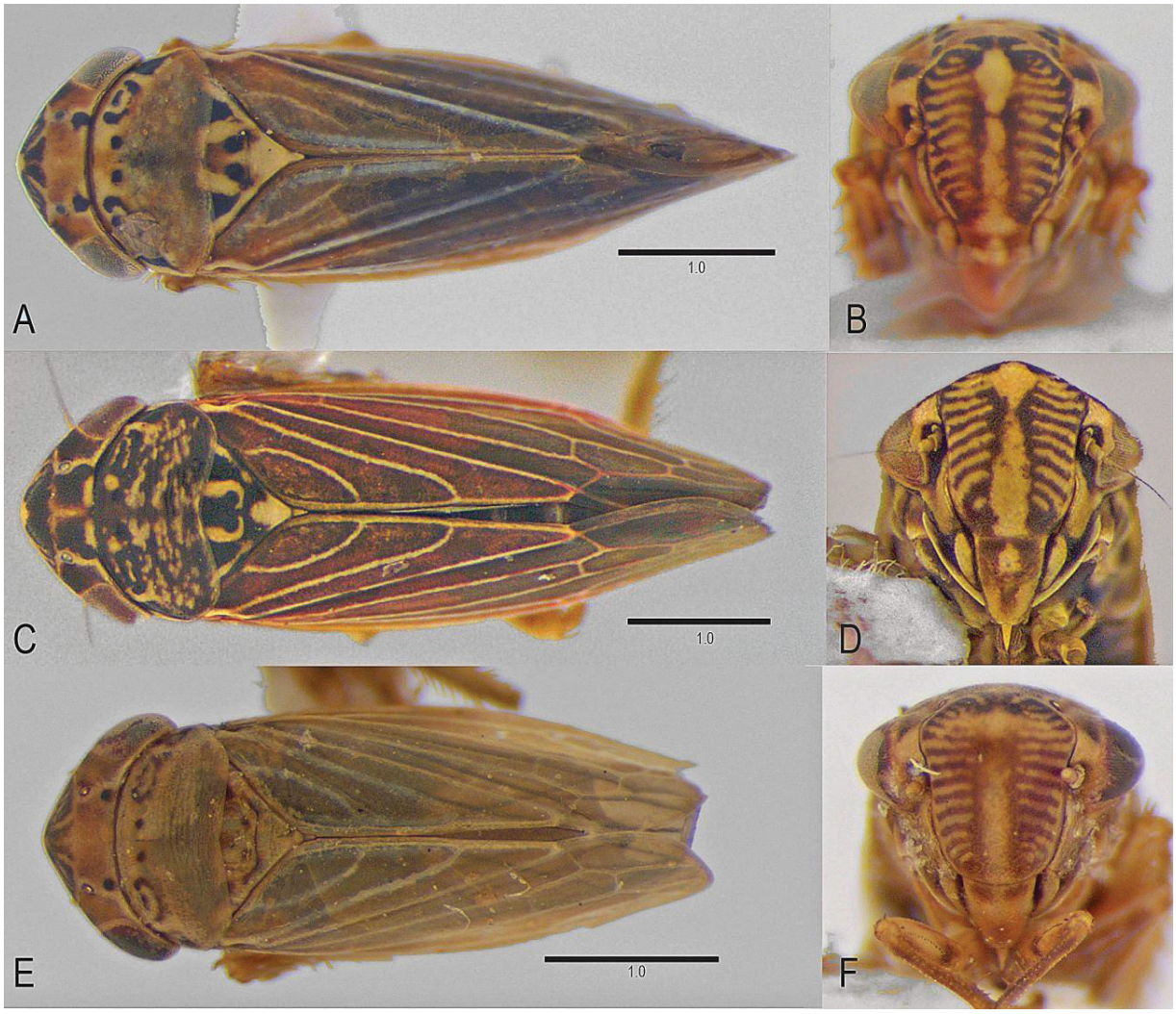

Figure 19. *Ciminius* females habitus, dorsal and frontal view, respectively. **A-B** *C. sp. nov. A.* **C-D** *C. sp. nov. B*. **E-F** *C. sp. nov. C.* Scale bars in mm.

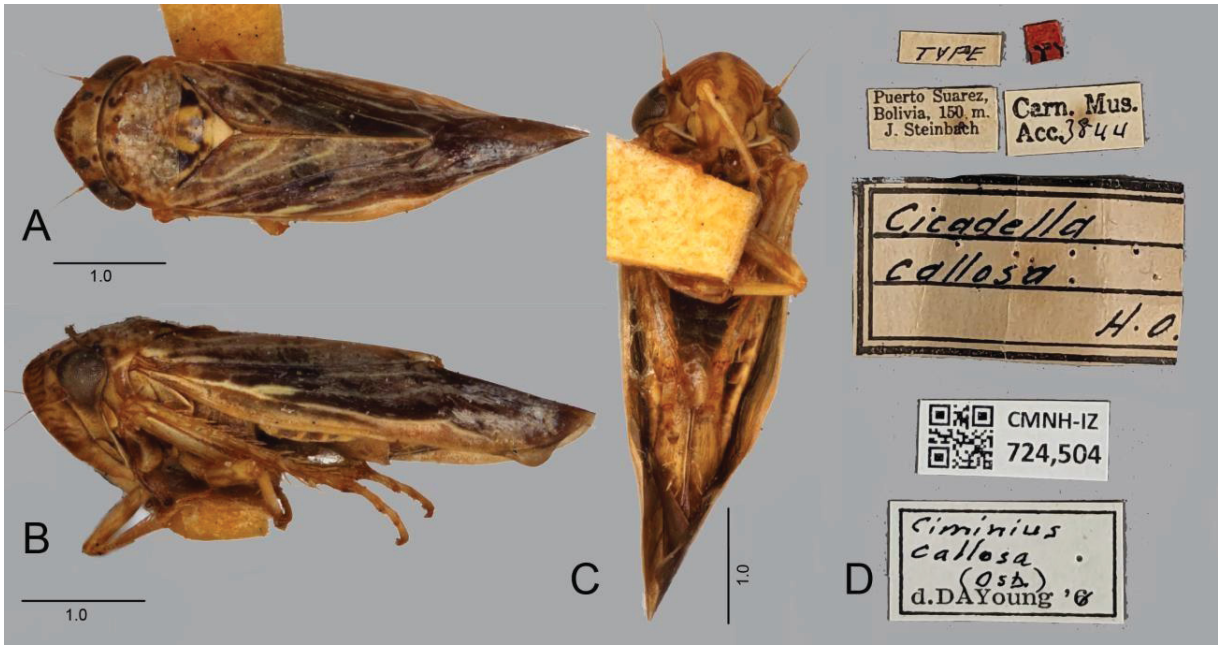

Figure 20. *Ciminius callosa* female holotype. **A** dorsal view. **B** lateral view. **C** ventral view. **D** precedence labels. Scale bars in mm.

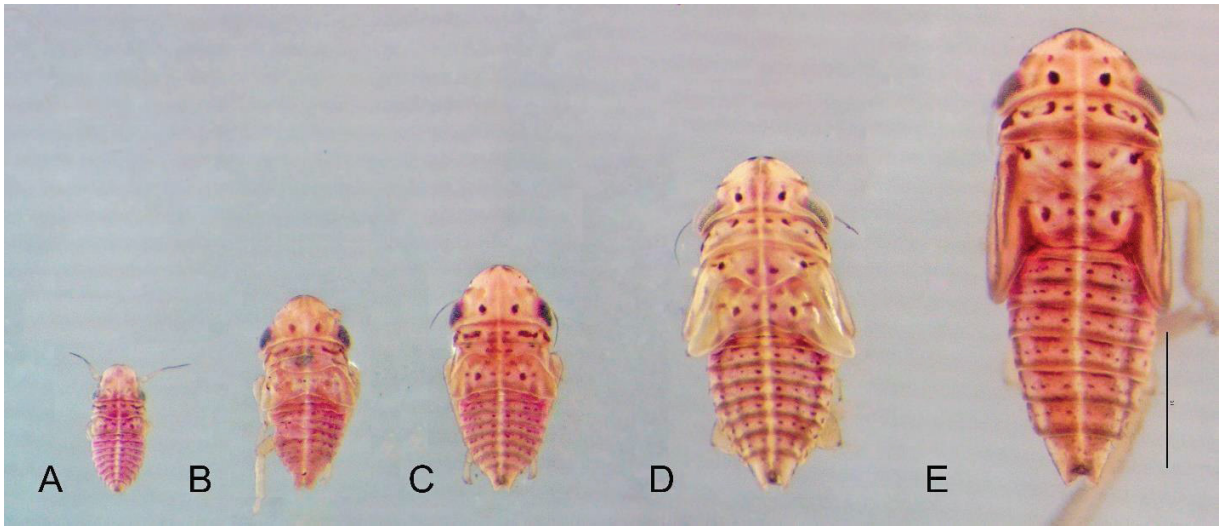

Figure 21. *Ciminius sp.* immature habitus comparison. **A** fifith instar **B** fourth instar **C** third instar **D** second instar **E** first instar.

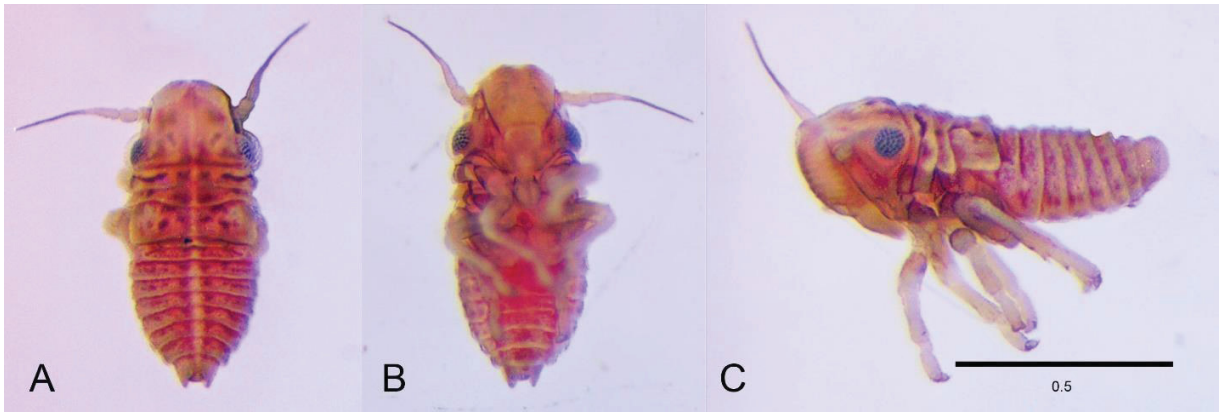

Figure 22. *Ciminius sp*. first instar nymph habitus. **A** dorsal view **B** ventral view **C** lateral view. Scale bars in mm.

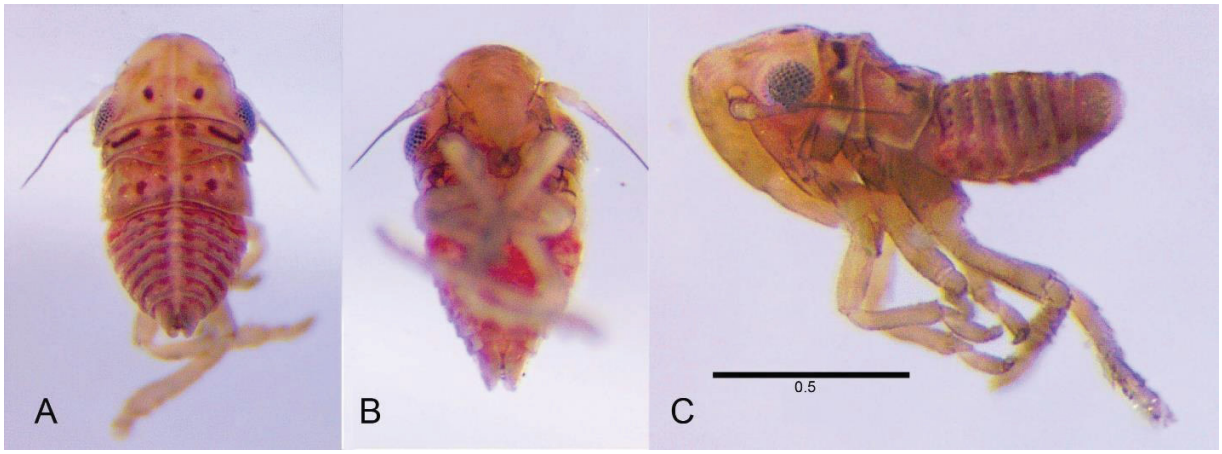

Figure 23. *Ciminius sp.* second instar nymph habitus. **A** dorsal view **B** ventral view **C** lateral view. Scale bars in mm.

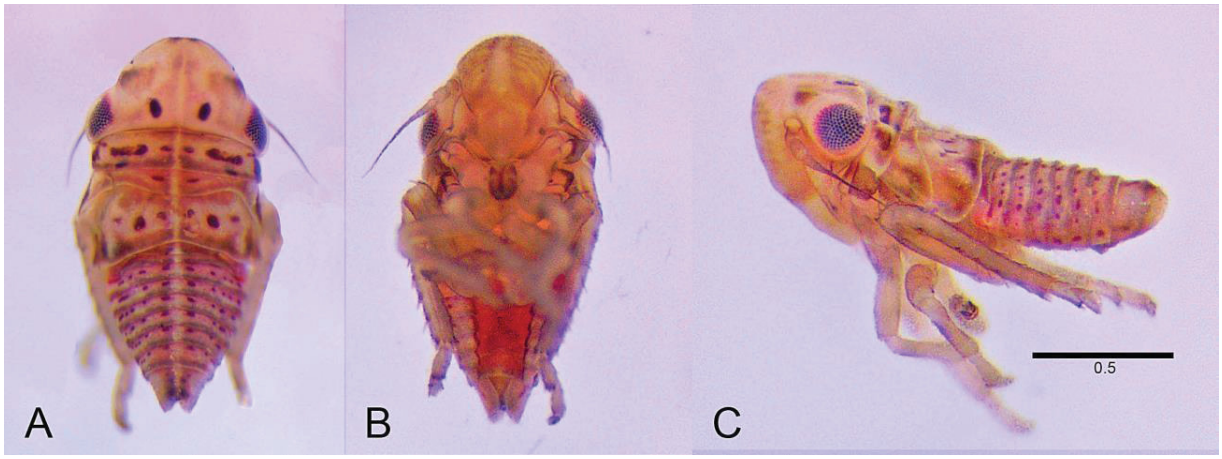

Figure 24. *Ciminius sp.* third instar nymph habitus. **A** dorsal view **B** ventral view **C** lateral view. Scale bars in mm.

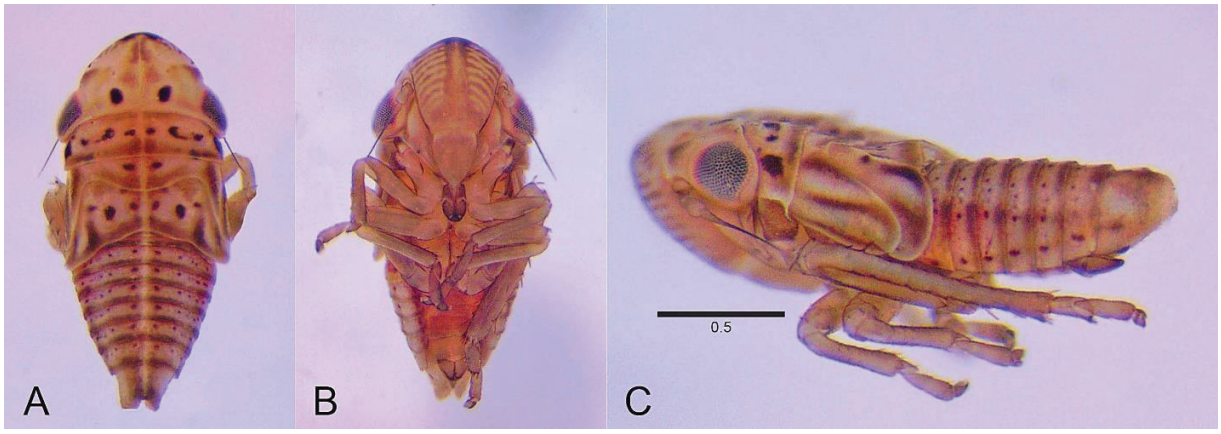

Figure 25. *Ciminius sp.* fourth instar nymph habitus. **A** dorsal view **B** ventral view **C** lateral view. Scale bars in mm.

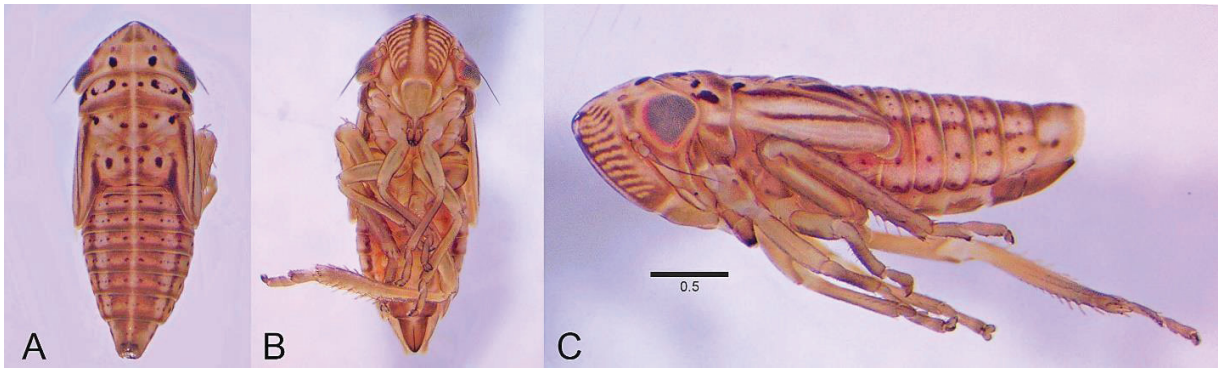

Figure 26. *Ciminius sp.* fifth instar nymph habitus. **A** dorsal view **B** ventral view **C** lateral view. Scale bars in mm.

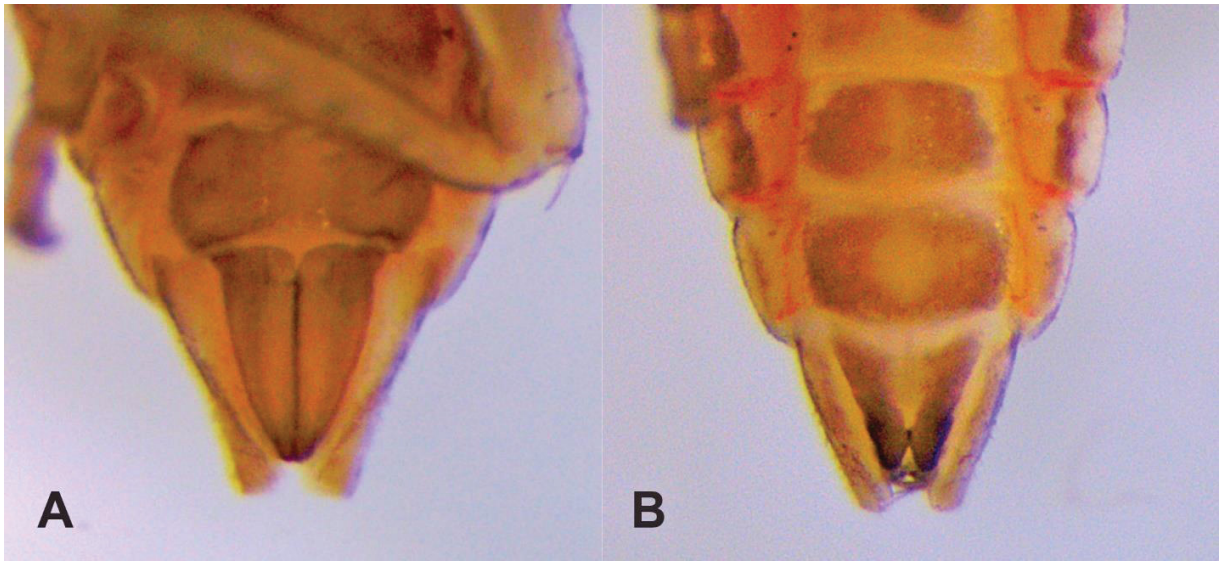

Figure 27. Terminalia of a *Ciminius sp.* fifth instar nymph. **A** female genital capsule. **B** male genital capsule.

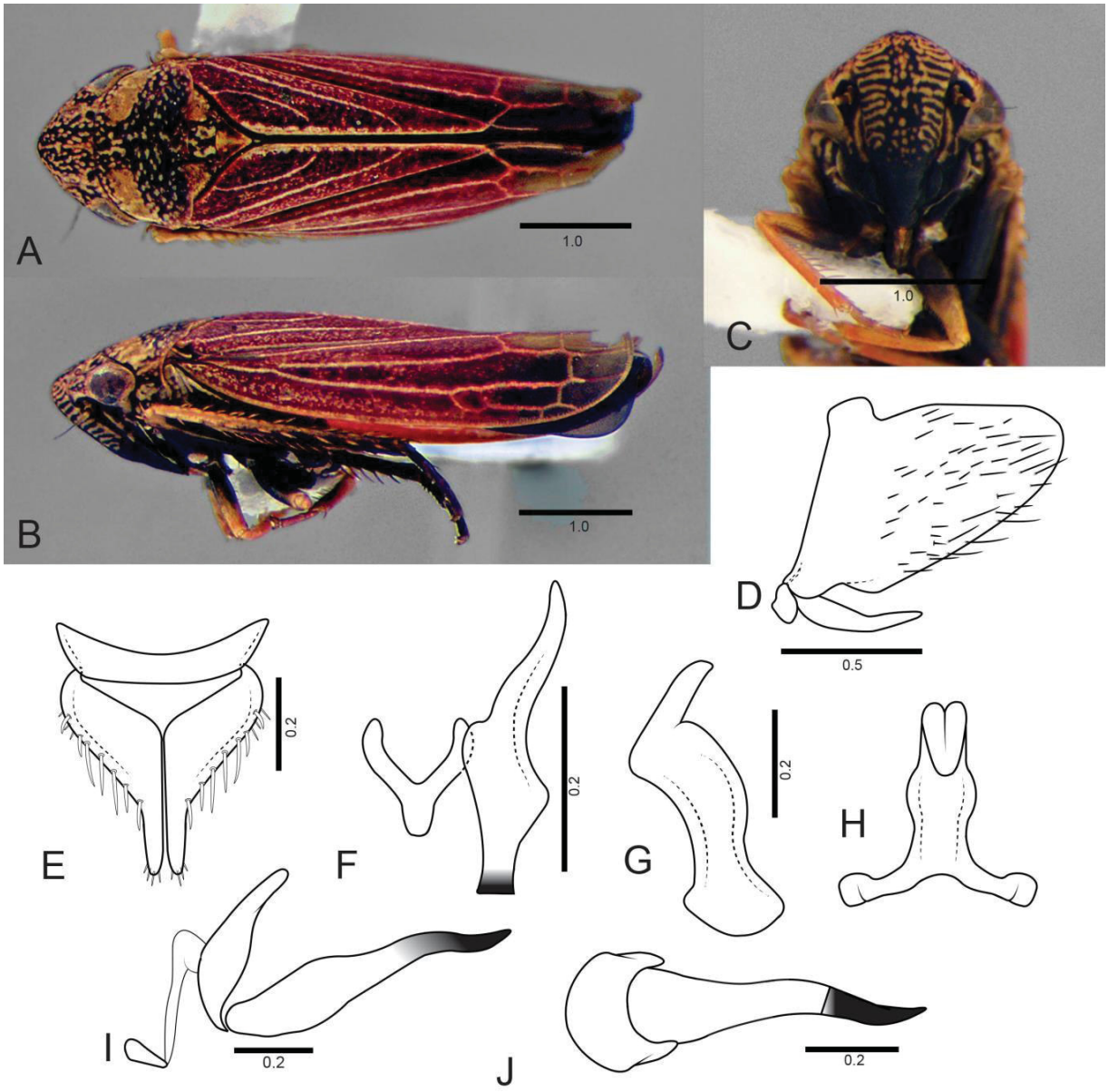

Figure 28. *New genus A sp. nov. D*, male holotype. **A** habitus, dorsal view. **B** habitus, lateral view. **C** head, frontal view. **D** pygofer, valve and subgenital plate, lateral view. **E** valve and subgenital plates, ventral view. **F** connective and style, ventral view. **G** aedeagus, lateral view. **H** aedeagus, caudoventral view. **I** connective, stem and paraphysis, lateral view. **J** paraphysis, dorsal view. Scale bars in mm

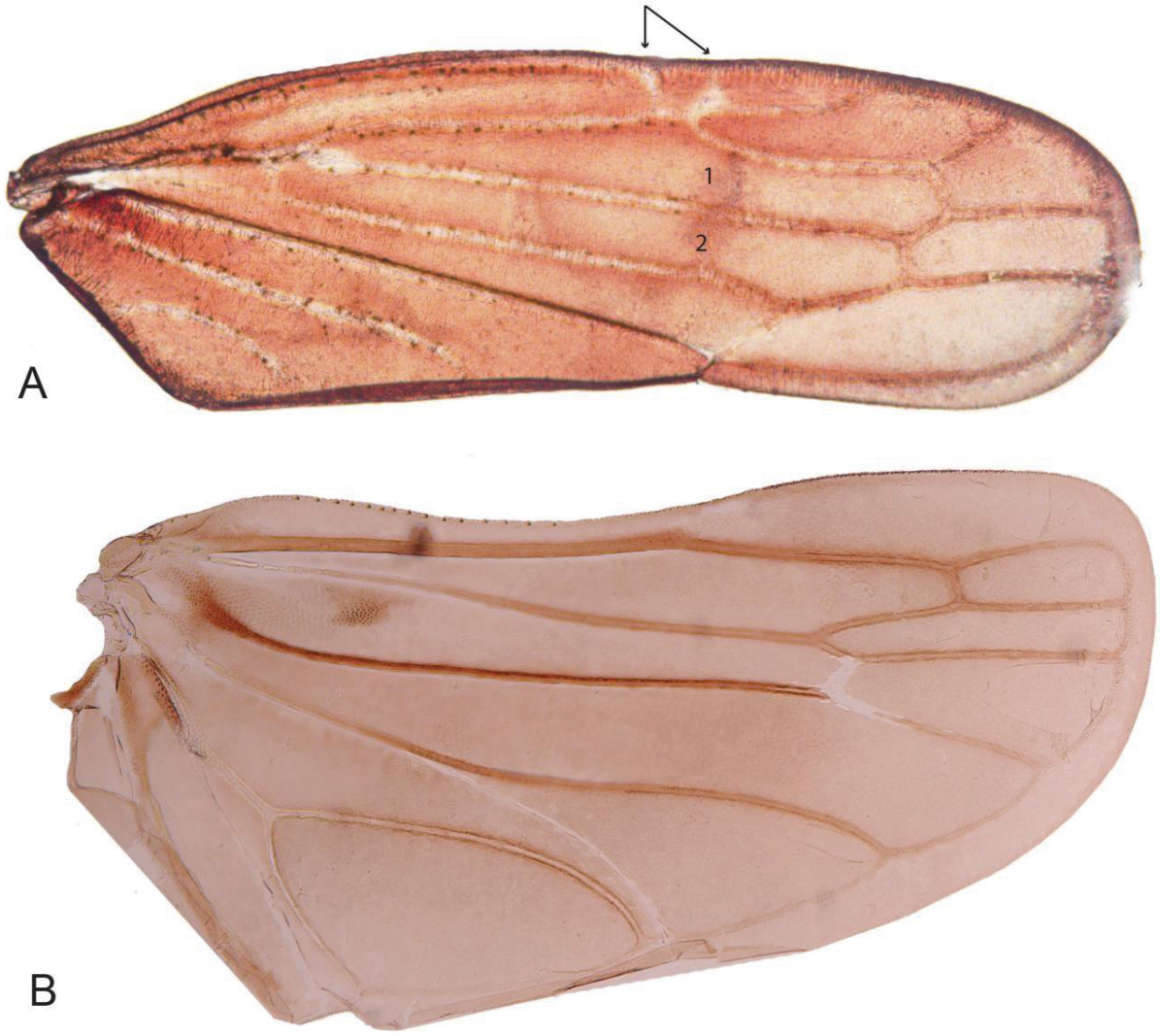

Figure 29. *Ciminius albolineatus* wings, clarified. **A** forewing, plexus of veins is pointed. First and second anteapical cells represented by 1 and 2, respectively. **B** hind wing.

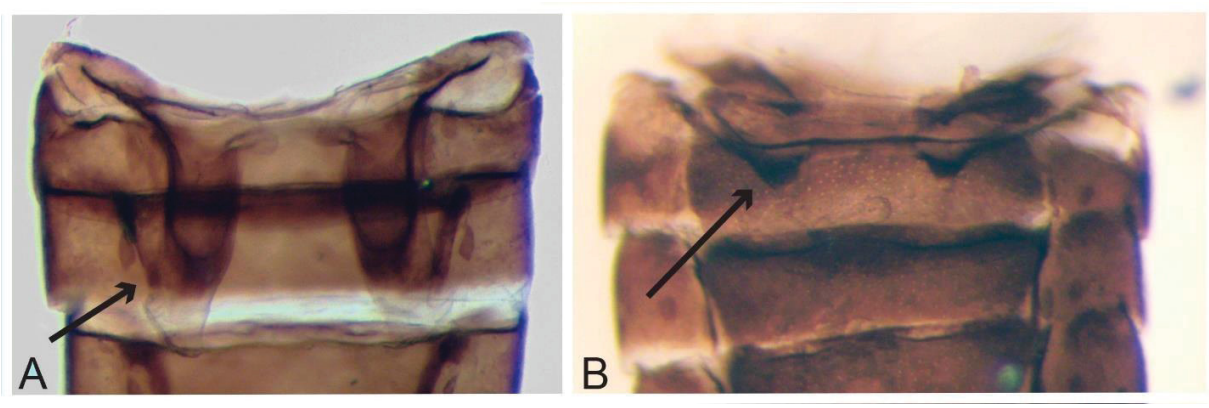

Figure 30. Abdominal apodemes morphology, in ventral view. **A** *Tylozygus geometricus*. **B** *Ciminius albolineatus.* Apodemes are pointed.

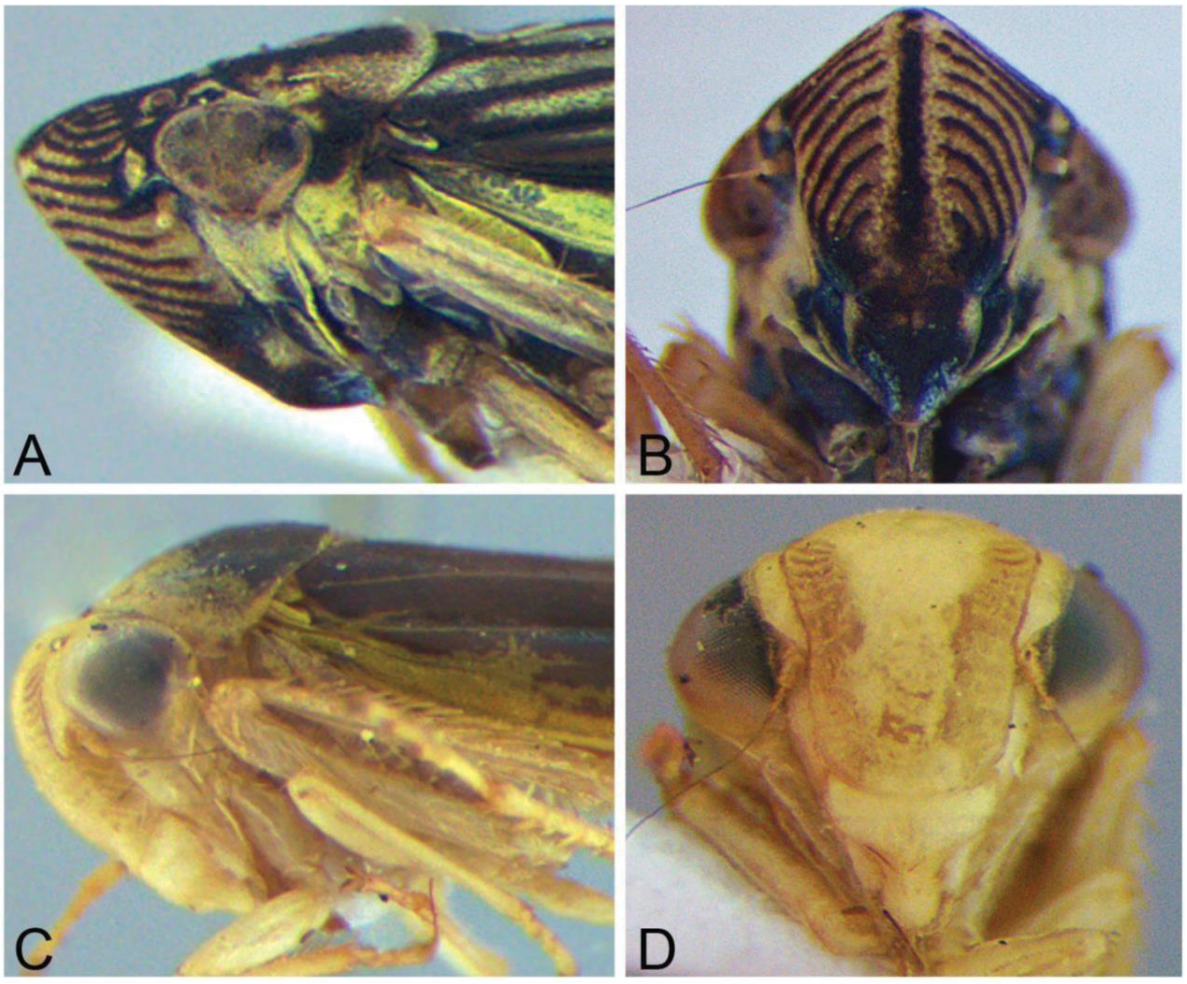

Figure 31. Clypeus morphology, lateral and frontal view, respectively. **A-B** *Syncharina punctatissima*. **C-D** *Rotigonalia olivacea*.

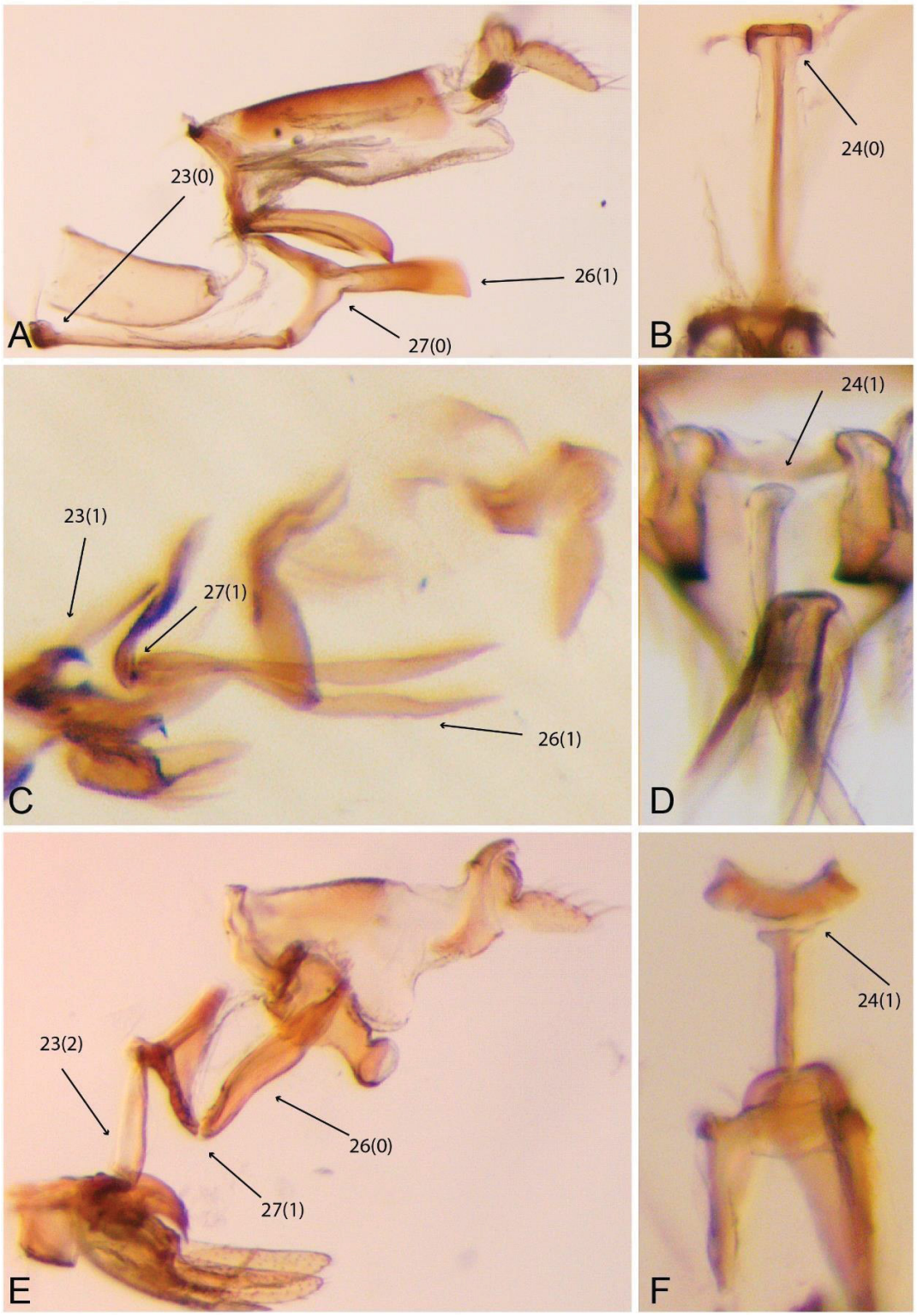

Figure 32. Internal genitalia comparison, lateral view and dorsal view, respectively. **A-B**. *Rotigonalia olivacea*. **C-D**. *Tylozygus geometricus*. **E-F.** *Ciminius platensis.*

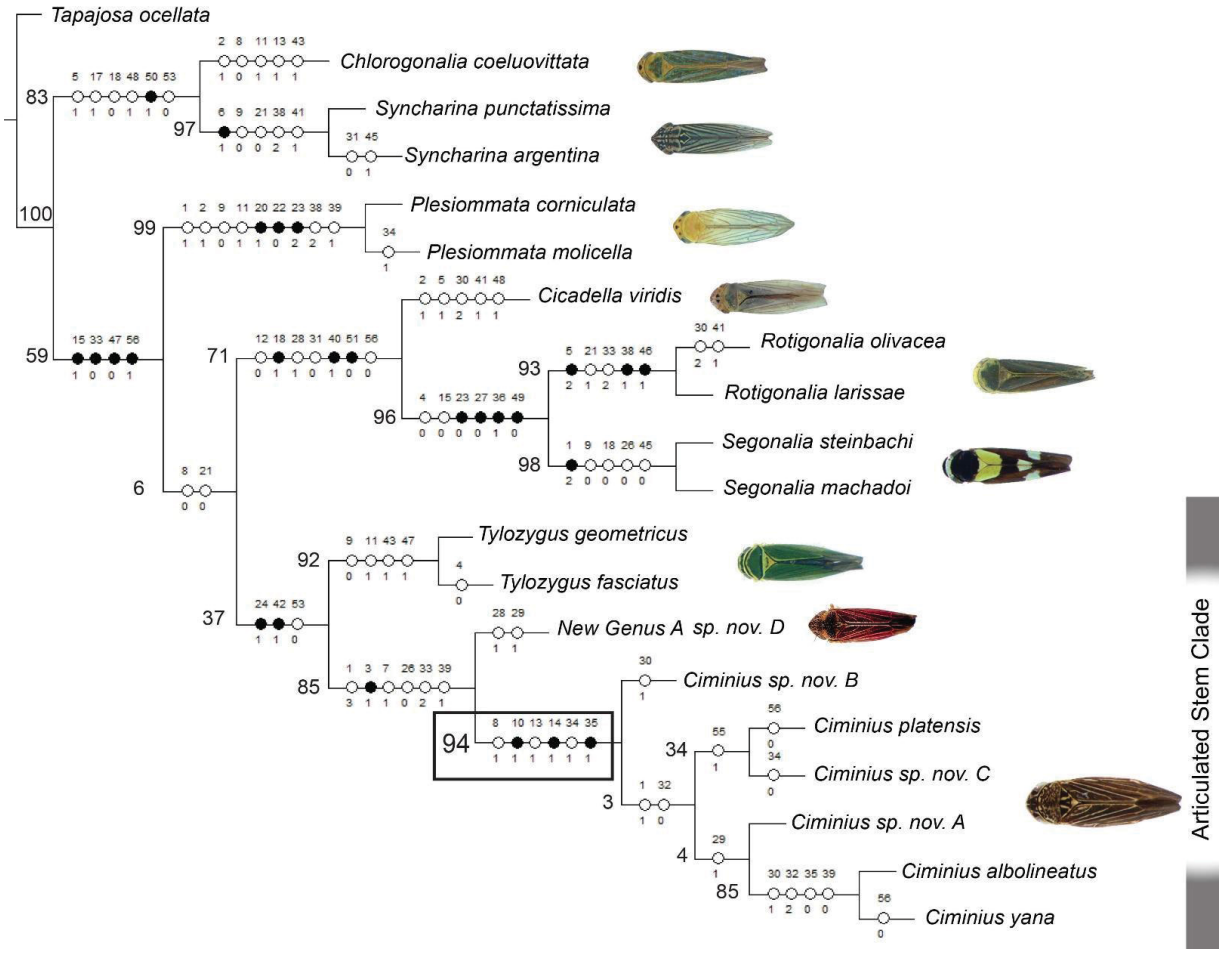

Figure 33. Phylogenetic relationships of *Ciminius*. Cladogram resulted of implied weighting (k=3; L = 131; Ci = 51; Ri=76). Symmetric resampling values are marked in front of branches. Unambiguous synapomorphic characters are marked with black circles, while homoplasies with empty circles.

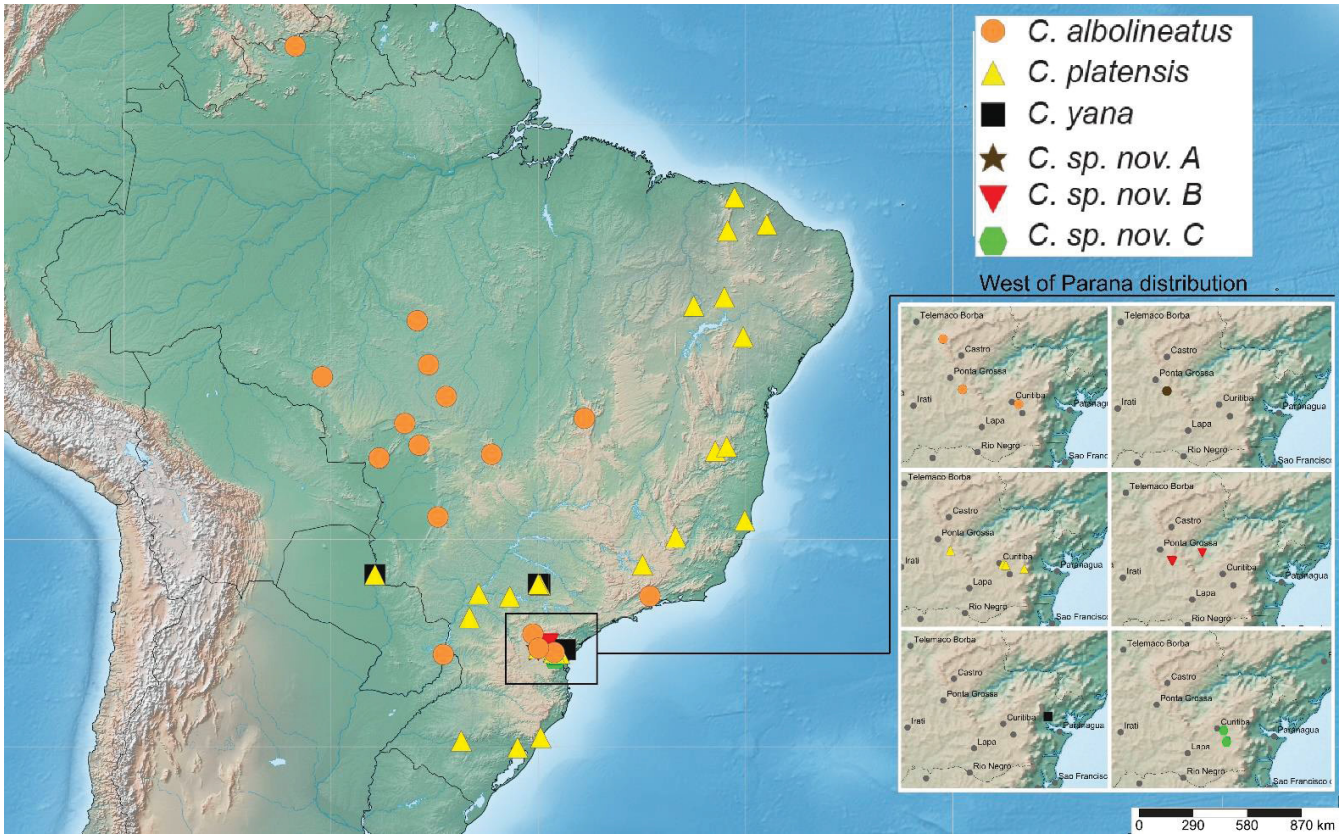

Figure 34. Occurrence map of the Neotropical *Ciminius*

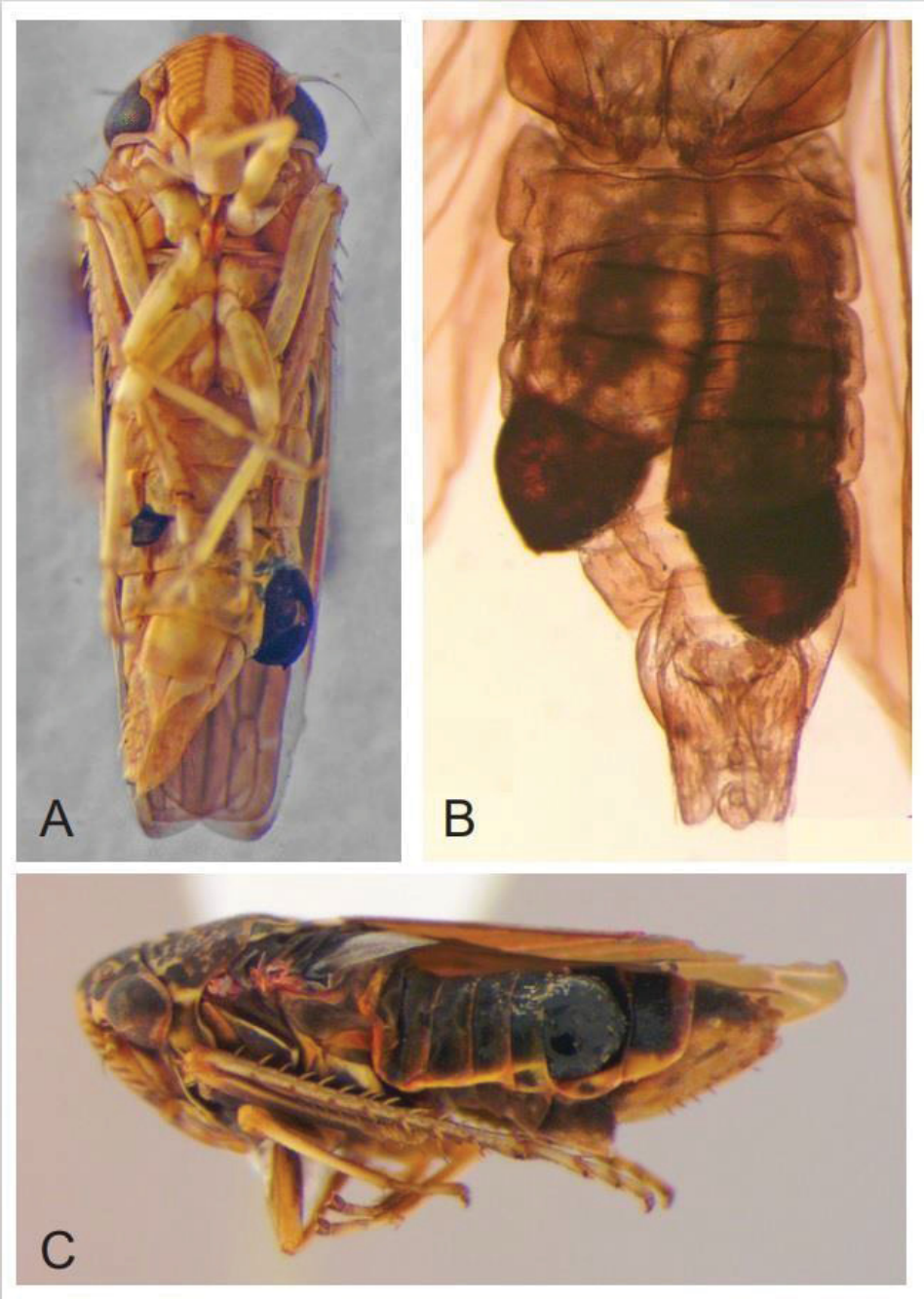

Figure 35. Records of parasitism by Strepsiptera in *Ciminius*. **A** *C. platensis* superparasitized, in ventral view. **B** *C. platensis* superparasitized, with abdomen clarified, in ventral view. **C** Female of *C. sp. nov. B*, in lateral view.

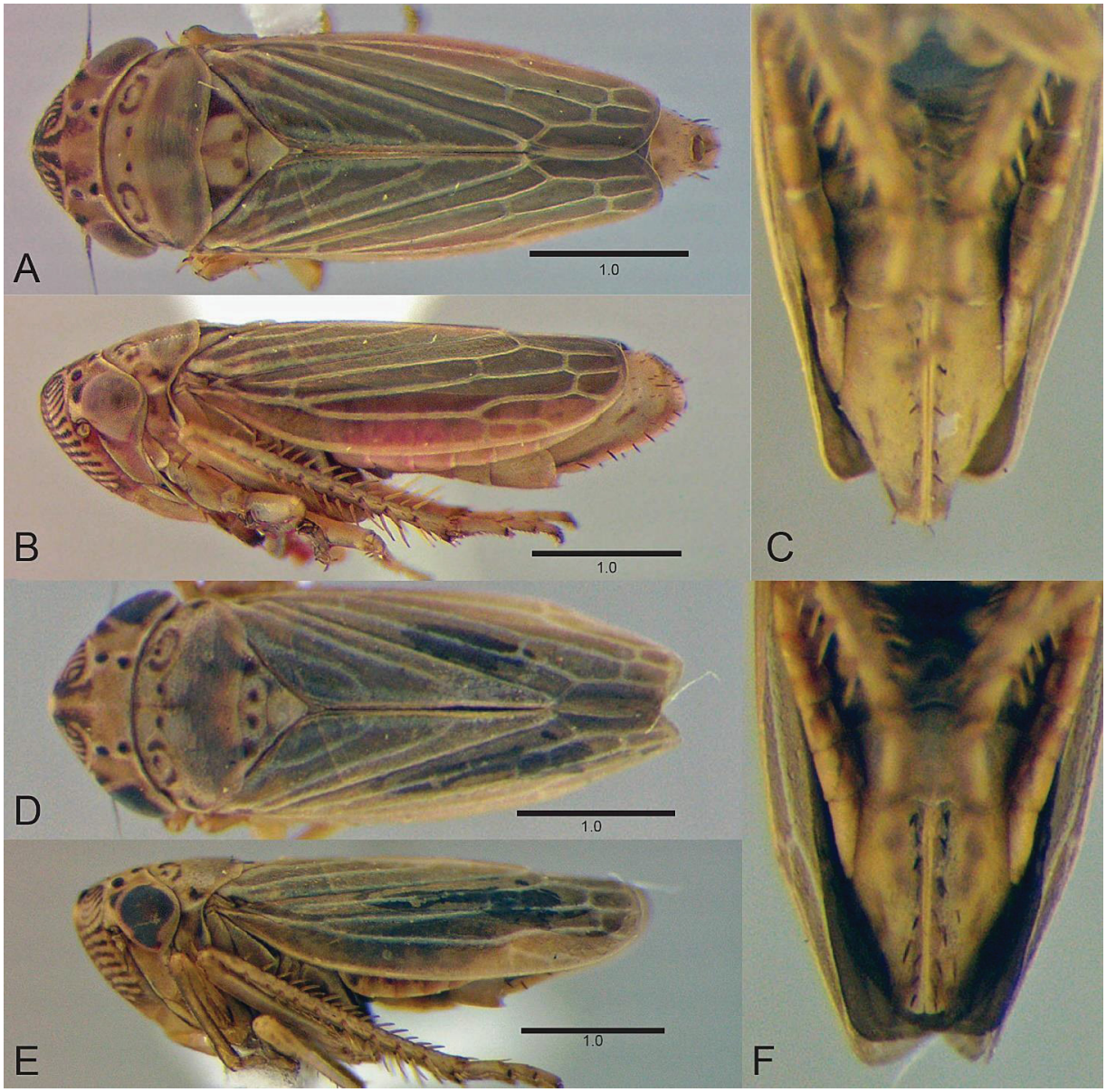

Figure 36. *Ciminius sp. nov. C* female, dorsal and lateral habitus, terminalia in ventral view, respectively. **A-C** specimen with submacropterous condition. **D-F** macropterous specimen. Scale bars in mm.

MATERIAL SUPLEMENTAR

1. Material examinado

Taxon	Specimens ♂	Specimens ♀	Type ♂	Type ♀	Locality (Country, State)
		Outgroup			
Tapajosa ocellata Melichar	1	1	-	-	
Cicadella viridis Linneaus	1	1	-	-	Italy
Chlorogonalia coeruleovittata (Signoret)	5	9	-	-	Brazil (Espírito Santo, Rio de Janeiro), Mexico
Segonalia steinbachi Young	2	1	-	-	Brazil (Mato Grosso do Sul, Minas Gerais), Paraguay
Segonalia machadoi Cavichioli & Takyia	-	-	1 (PT)	1 (PT)	Brazil (Maranhão, Pará, Piauí)
Rotigonalia larissae Cavichioli	-	-	1 (PT)	1 (PT)	Brazil (Rondônia)
Rotigonalia olivacea Cavichioli	-	-	1 (PT)	1 (PT)	Brazil (Mato Grosso)
Plesiommata corniculata Young	5	1	-	-	Brazil (Paraná)
Plesiommata molicella Fowler	2	1	-	-	Brazil (Paraná, Santa Catarina)
Syncharina argentina (Berg)	5	1	-	-	Argentina, Brazil (Paraná)
Syncharina punctatissima (Signoret)	3	1	-	-	Brazil (Paraná)
Tylozygus fasciatus (Walker)	5	1	-	-	Costa Rica
Tylozygus geometricus (Signoret)	5	1	-	-	Brazil (Paraná, Rio de Janeiro)
New Genus A sp. nov. D	-	-	1 (HT)	-	Brazil (Paraná)
		Ingroup			
Ciminius albolineatus (Taschenberg)	75	63	-	-	Brazil (Goiás, Mato Grosso, Rondônia, Roraira, Paraná, São Paulo)
Ciminius callosa (Osborn)	-	-	-	1(HT)*	Bolivia
Ciminius platensis (Berg)	83	152	-	-	Brazil (Bahia, Ceará, Espírito Santo, Minas Gerais, Mato Grosso do Sul, Pernambuco, Piauí, Paraná, Rio Grande do Sul, São Paulo)
Ciminius yana Young	12	6	-	1(HT)*	Brazil (Mato Grosso do Sul, Paraná, São Paulo)
Ciminius sp. nov. A	-	-	1 (HT), 5 (PT)	1 (PT)	Brazil (Paraná)
Ciminius sp. nov. B	-	-	1 (HT), 40 (PT)	42 (PT)	Brazil (Paraná)
Ciminius sp. nov C	-	-	1 (HT), 50 (PT)	14 (PT)	Brazil (Paraná)

2.Matriz de Caracteres

	0 1	2 3	4 5	
Tapajosa ocellata	3 0 0 1 0 2 1 1 1 0	0 0 0 0 0 – 0 2 0 0	1 - - - 0 - - - - -	- - 1 0 0 0 – 0 0 0	0 0 0 0 0 0 1 0 1 0	1 1 1 0 1 2
Segonalia steinbachi	2 0 0 0 0 0 0 0 0 0	0 0 0 0 0 – 2 0 0 0	0 1 0 0 1 0 0 1 0 0	0 2 0 0 0 1 0 0 0 1	0 0 0 0 0 0 0 0 0 0	0 1 1 1 0 0
Segonalia machadoi	2 0 0 0 0 0 0 0 0 0	0 0 0 0 0 – 2 0 0 0	0 1 0 0 1 0 0 1 0 0	0 2 0 0 0 1 0 0 0 1	0 0 0 0 0 0 0 0 0 0	0 1 1 1 0 0
Rotigonalia olivacea	0 0 0 0 2 0 0 0 1 0	0 0 0 0 0 – 1 1 0 0	1 1 0 0 1 1 0 1 0 2	0 0 2 0 0 1 1 1 0 2	1 0 0 0 1 1 0 0 0 0	0 1 1 1 0 0
Rotigonalia larissae	0 0 0 0 2 0 0 0 1 0	0 0 0 0 0 – 1 1 0 0	1 1 0 0 1 1 0 1 0 0	0 2 2 0 0 1 1 1 0 1	0 0 0 0 1 1 0 0 0 0	0 1 1 1 0 0
Cicadella viridis	0 1 0 1 1 0 0 0 1 0	0 0 0 0 1 1 0 1 1 0	0 1 1 0 1 1 1 1 0 2	0 0 0 0 0 0 – 0 0 -	1 0 0 1 1 0 0 1 1 0	0 0 1 1 0 0
Plesiommata corniculata	1 1 0 1 0 0 0 1 0 0	1 1 0 0 1 0 0 2 1 1	1 0 2 0 0 - - - - -	- - 0 0 0 0 – 2 1 1	0 0 0 1 1 0 0 0 1 0	1 1 1 1 0 1
Plesiommata molicella	1 1 0 1 0 0 0 1 0 0	1 1 0 0 1 0 0 2 1 1	0 2 0 0 - - - - - -	- - 0 1 0 0 – 2 1 0	0 0 0 1 0 0 0 0 1 0	1 0 1 1 1 1
Chlorogonalia coeluovittata	0 1 0 1 1 0 0 0 1 0	1 1 1 0 0 – 1 0 1 0	1 1 1 0 1 1 1 0 0 0	1 2 1 0 0 0 – 0 0 2	0 0 1 1 0 0 1 1 1 1	1 0 0 0 1 2
Syncharina punctatissima	0/2 0 0 1 1 1 1 1 0 0	0 1 0 0 0 – 1 0 1 0	0 1 1 0 1 1 1 0 0 0	1 0 1 0 0 0 – 2 0 1	1 0 0 1 0 0 1 1 1 1	1 1 0 0 1 2
Syncharina argentina	0 0 0 1 1 1 1 1 0 0	0 1 0 0 0 – 1 0 1 0	0 1 1 0 1 1 1 0 0 0	0 1 1 0 0 0 – 2 0 1	1 0 0 1 1 0 1 1 1 1	1 1 0 0 1 2
Tylozygus geometricus	0 0 0 1 0 0 0 0 0 0	1 1 0 0 1 1 0 2 0 0	0 1 1 1 1 1 1 0 0 0	1 1 0 0 0 0 – 0 0 1	0 1 1 0 1 0 1 0 1 0	1 0 0 0 0 1
Tylozygus fasciatus	0 0 0 0 0 0 0 0 0 0	1 1 0 0 1 1 0 2 0 0	0 1 1 1 1 1 1 0 0 0	1 1 0 0 0 0 – 0 0 1	0 1 1 0 1 0 1 0 1 0	1 0 0 0 0 1
New Genus A	3 0 1 1 0 0 1 0 1 0	0 1 0 0 1 0 0 2 0 0	0 1 1 1 1 0 1 1 1 0	1 1 2 0 0 0 – 0 1 -	- - - - - - - - - -	- - - - - -
Ciminius albolineatus	1/2 0 1 1 0 0 1 1 1 1	0 – 1 1 1 0 0 2 0 0	0 1 1 1 1 0 1 0 1 1	1 2 2 1 0 0 – 0 0 1	0 1 0 0 1 0 0 0 1 0	1 0 0 0 0 1
Ciminius platensis	1 0 1 1 0 0 1 1 1 1	0 – 1 1 1 0 0 2 0 0	0 1 1 1 1 0 1 0 0 0	1 0 2 1 1 0 – 0 1 1	0 1 0 0 1 0 0 0 1 0	1 0 0 0 1 0
Ciminius yana	1/2 0 1 1 0 0 1 1 0 /1 1	0 – 1 1 1 0 0 2 0 0	0 1 1 1 1 0 1 0 1 1	1 2 2 1 0 0 – 0 0 1	0 1 0 0 1 0 0 0 1 0	1 0 0 0 0 0
Ciminius sp. nov A	1 0 1 1 0 0 1 1 1 1	0 – 1 1 1 0 0 2 0 0	0 1 1 1 1 0 1 0 1 0	1 0 2 1 1 0 – 0 1 1	0 1 0 0 1 0 0 0 1 0	1 0 0 0 0 1
Ciminius sp. nov. B	2/3 0 1 1 0 0 1 1 0 /1 1	0 – 1 1 1 0 0 2 0 0	0 1 1 1 1 0 1 0 0 1	1 1 2 1 1 0 – 0 1 1	0 1 0 0 1 0 0 0 1 0	1 0 0 0 0 1
Ciminius sp. nov. C	1/2 0 1 1 0 0 1 1 0 /1 1	0 – 1 1 1 0 0 2 0 0	0 1 1 1 1 0 1 0 0 0	1 0 2 0 1 0 – 0 1 1	0 1 0 0 1 0 0 0 1 0	1 0 0 0 1 1