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Taxonomic review of the plant bug genera *Amapacylapus* and *Cylapus* with descriptions of two new species and a key to the genera of Cylapini (Hemiptera: Heteroptera: Miridae)

Andrzej WOLSKI

Department of Biosystematics, Opole University, Oleska 22, 45–052 Opole, Poland;
e-mail: miridae78@gmail.com

Abstract. The plant bug tribe Cylapini (Hemiptera: Heteroptera: Miridae: Cylapinae) is diagnosed and a worldwide key to the genera of the tribe is provided. The taxonomic review of the New World Cylapini genera *Amapacylapus* Carvalho & Fontes,1968 and *Cylapus* Say, 1832 is provided, including a key to species, diagnoses and redescriptions of genera and most included species, and descriptions of two new species, *Amapacylapus unicolor* sp. nov. (Ecuador) and *Cylapus luridus* sp. nov. (Brazil). Illustrations of the male genitalia, color photographs of the adult and scanning electron micrographs of the selected species are provided. The genus *Cylapocerus* Carvalho & Fontes, 1968 syn. nov. is proposed as a junior synonym of *Cylapus* with all species currently placed in *Cylapocerus* transferred to *Cylapus*. The following new combinations are established: *Cylapus amazonicus* (Carvalho, 1989) comb. nov., *Cylapus antennatus* (Carvalho & Fontes, 1968) comb. nov., and *Cylapus tucuruiensis* (Carvalho, 1989) comb. nov. *Peltidocylapus labeculosus* (Bergroth, 1922) is transferred to the genus *Amapacylapus* as *Amapacylapus labeculosus* (Bergroth, 1922) comb. nov. Male neotype is designated for *Cylapus tenuicornis* Say, 1832. The following new country records are provided: *Amapacylapus amapariensis* Carvalho & Fontes, 1968 (Ecuador, Guyana); *Cylapus amazonicus* (Bolivia, Ecuador); *Cylapus antennatus* (Ecuador); *Cylapus citus* Bergroth, 1922 (Bolivia, Brazil, Guyana, Peru); *Cylapus marginicollis* (Distant, 1883) (Nicaragua, Panama); *Cylapus ruficeps* Bergroth, 1922 (Brazil, Colombia, Ecuador); *Cylapus tenuicornis* (USA); *Cylapus tucuruiensis* (Venezuela).

Key words. Heteroptera, Miridae, Cylapinae, Cylapini, *Amapacylapus*, *Cylapus*, diagnosis, key, new combination, new species, new synonym, Neotropical Region

Introduction

The Cylapinae (Heteroptera: Miridae) are a small group occurring predominantly in the tropical and subtropical regions of the world (Gorczyca 2006b). Six tribes are currently recognized within Cylapinae, namely Bothriomirini, Cylapini, Fulviini, Psallopini, Rhinomirini, and Vanniini (Gorczyca 2006b, Cassis & Schuh 2012, Wolski & Henry 2015) although their identities as well as the relationships within the subfamily remain poorly understood (Gorczyca 2006, Herczek et al. 2016, Namyatova et al. 2016). A broader sampling of the range of morphological characters and taxa would improve these phylogenetic studies. Our knowledge of the biodiversity within the Cylapinae, and their distribution, biology, and morphological diversity is also insufficient. Although over the last two decades several genus and tribal level groups have been revised and relatively large amount of new taxa have been described (e.g. Carvalho & Costa 1994; Gorczyca 1998, 2000, 2002, 2006a; Gorczyca & Chérot 1998; Chérot & Gorczyca 2000; Cassis et al. 2003; Cassis & Monteith 2006; Wolski 2010, 2012, 2013a,b, 2015; Wolski & Gorczyca 2012, 2014; Moulds & Cassis 2006; Wolski & Henry 2012, 2015; Gorczyca et al. 2016; Wolski et al. 2016; Namyatova & Cassis 2016; Wolski et al. 2016; Wolski & Yasunaga 2016) there is still a significant taxonomic impediment for Cylapinae. It is especially true for the nominotypical tribe Cylapini where most of our knowledge is restricted to the original, generic and specific descriptions. This paper, providing revised diagnoses, redescriptions, descriptions of new species, and key to species of the cylapine genera *Amapacylapus* Carvalho & Fontes, 1968 and *Cylapus* Say, 1832 is part of a series of ongoing efforts towards improving our knowledge of the subfamily Cylapinae. *Cylapus* as defined by Poppius (1909) included species currently placed in *Cylapus*, *Peltidocylapus* Poppius, 1909, and *Valdasus* Stål, 1860 was distinguished from other genera of the Cylapini by the distinctly punctate dorsum, strongly pedunculate eyes, and well exposed mesoscutum. Poppius (1909) divided *Cylapus* into three subgenera: *Cylapus*, *Peltidocylapus*, and *Trichocylapus* Poppius, 1909. Carvalho & Fontes (1968) elevated these subgenera to the generic level and provided descriptions of two additional genera: *Cylapocerus* Carvalho & Fontes, 1968 and *Amapacylapus* Carvalho & Fontes, 1968. They also restored the generic status of *Valdasus* with the single species *Valdasus schoenherri* Stål, 1860 (Carvalho & Fontes 1968), previously subsumed in *Cylapus* (Carvalho 1957). The status of all these genera, except for the genus *Trichocylapus* synonymized with *Cylapus* by Carvalho (1980) and further authors, currently remains unchanged. Herein this paper includes the revised diagnoses and redescriptions of *Amapacylapus* and *Cylapus*, diagnoses and redescriptions of all treated species, descriptions of two new species and keys to most species of the genera. *Cylapocerus* is proposed as a junior synonym of *Cylapus* and *Peltidocylapus labeculosus* (Bergroth, 1922) is transferred to *Amapacylapus*. Additionally, the diagnosis of the tribe Cylapini and key to the worldwide genera of the tribe are provided.

Material and methods

Observations were made using Olympus SZX12 stereomicroscope and Olympus BX50 optical microscope. Scanning electron micrographs were taken using Hitachi S-3400N and

Hitachi S3000N. Measurements were taken using an eyepiece (ocular) micrometer; all measurements are given in millimeters. The measured body parts were defined in Wolski (2015), except for head length here defined as distance between apex of vertex and posterior margin on vertex when viewed dorsally. Dissections of male genitalia were performed using the technique mentioned by Kerzhner & Konstantinov (1999). The terminology of the male genitalic structures follows Konstantinov (2003) for the elements of the genital capsule and parameres and Cassis (2008) in using the term "endosoma" for the male intromittent organ. The material examined included 114 specimens loaned from the institutions listed below.

The following abbreviations for these institutions are used throughout this paper:

AMNH American Museum of Natural History, New York, USA;
BMNH Natural History Museum, London, United Kingdom;
MRAC Musee Royal de l'Afrique Centrale, Tervuren, Belgium;
NHMW Naturhistorisches Museum in Wien, Wien, Austria;
NHRS Naturhistoriska Riksmuseet, Stockholm, Sweden;
USNM Systematic Entomology Laboratory [SEL], ARS, USDA, c/o National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA;
ZMPA Zoological Institute, Polish Academy of Sciences, Warsaw, Poland;
ZSMC Zoologische Staatssammlung, München, Germany.

Taxonomy

Cylapini Kirkaldy, 1906

Cylapini Kirkaldy, 1906: 134. Type genus *Cylapus* Say, 1832.

Diagnosis. Members of the tribe are recognized by the following characters: dorsal surface smooth or punctate, covered with simple setae, without ornamentation composed of tiny and dense tubercles (Fig. 128); head hypognathous (Figs 6, 7, 9, 34, 56–65, 108, 123, 148, 150); vertex more or less sulcate along midline, anterior portion of vertex perpendicular to the rest of vertex (Figs 6, 7–9, 28, 33, 34, 56–65, 91, 92, 95, 107, 108, 120, 123, 148, 150); posterior margin of maxillary and mandibular plates situated at the same line as anterior margin of eye; maxillary plate much narrower than mandibular plate; ventral margin of eye not reaching or barely reaching base of mandibular plate; buccula ringlike; eye projected above plane of vertex (Figs 9, 34, 91, 123, 148, 150); eye with short and sparse interocular setae and flat ommatidia (Fig. 124); antenna threadlike, long, usually as long as or longer than body length, with segments III and IV longer than II (Figs 2, 3, 36, 42, 45, 46, 52); labial segments I and II not subdivided (Figs 9, 95, 125, 126, 150); pronotal collar distinct, narrow, dorsally and laterally delimited by the rather deep depression placed anteriorly to the propleural suture (Figs 8, 9, 28, 31, 33, 34); mesepimeral spiracle (msp) usually elongate and slitlike, surrounded by mushroom bodies (Figs 10, 32, 35, 93, 96, 108, 129, 146, 149, 151); metathoracic scent gland evaporative area (ea) oval, broad, well expanded onto lateral margin of metepisternum; metepisternum with posterior carina (pc) (Figs 10, 32, 35, 93, 96, 108, 129, 146, 149, 151, arrow); peritreme (per) more or less raised from the evaporative area (Figs 10, 32, 35, 93, 96, 108, 129, 146, 149, 151, arrow); genital capsule with dorsal wall short, much shorter than ventral wall, opening oriented upward (Figs 17, 134); proctiger distinctly developed

and strongly sclerotized (Fig. 134); vestiture on dorsal surface of the paramere body absent (e.g. Figs 14, 16, 20, 22, 68, 70, 73, 75); ductus seminis usually relatively broad and short; secondary gonopore clearly present, well developed (Figs 12, 18, 66, 71, 80, 85, 97, 102, 110, 115, 135, 140).

Discussion. The phylogenetic analysis conducted by Gorczyca (2000) proposed that Rhinomirini is the closest relative of Cylapini with both linked primarily by the long antenna. This analysis, however, did not include the *Vannius* Distant, 1883 complex, a group of genera with vertical head and long antennae similar to those found in Cylapini, which was postulated to be related to the genus *Palaucoris* Carvalho, 1956 and transferred to the subfamily Palaucorinae (Gorczyca 1997) based on the spatulate parempodia found in both taxa. Subsequently *Vannius* complex was restored to Cylapinae by Cassis et al. (2003) and the phylogenetic analyses of the genera of *Vannius* complex (Cassis et al. 2003, Cassis & Monteith 2006) revealed close relationship between Cylapini and *Vannius* complex based mostly on the vertical head, showing a member of Cylapini as their sister group. Cassis & Schuh (2012) recognizing the tribe Vanniini, noted the close similarity between Cylapini and Vanniini with both sharing the vertical head. Konstantinov (2013), supporting the views of Gorczyca (1997), suggested *Palaucoris* as a sister group of *Vannius* complex within Cylapinae paying attention that the vertical head occurring in both taxa being typical to Cylapini. The close relationship of Cylapini and Vanniini was also revealed by Namyatova et al. (2016). Their phylogenetic analysis of the subfamily Bryocorinae, including several cylapines as outgroup taxa, showed monophyly of a group containing Cylapini (*Amapacylapus*), members of the *Vannius* complex, and *Palaucoris* and they proposed to place the latter in the tribe Vanniini. The information obtained from the present study and the literature data indicate that some of the synapomorphies linking Cylapini and Vanniini presented by Namyatova et al. (2016) occur only in the latter tribe and are not found in Cylapini. For example, the gula, oriented vertically in *Vannius* complex and *Palaucoris* (Cassis et al. 2003: Figs 1A, 2B; Konstantinov 2013: Fig. 4D; Namyatova et al. 2016: Figs 7A, B), in the members of Cylapini is horizontal or subhorizontal (Figs 9, 92, 123, 148, 151). While in the Cylapini the pronotal collar is rather thin, dorsally and laterally delimited by the rather deep depression placed anteriorly to the propleural suture (Figs 8, 9, 28, 31, 33, 34) in *Vannius* complex and *Palaucoris* the collar is flat and widely delimited by the shallow depression extending directly to propleural suture at sides (Konstantinov 2013: Figs 4D, E; Namyatova et al. 2016: Figs 5A, B). Other characters shown as synapomorphies for Cylapini and Vanniini also occur in other cylapine tribes. These include the head with ventral margin of the eye not reaching maxillary plate which is found also in Bothriomirini (Wolski & Gorczyca 2012: Fig. 20; Wolski 2012: Fig. 3D) and the tibiae without black spinules that are also present in Bothriomirini, and are mosaically spread among Fulviini and Rhinomirini (Wolski, pers. observ.). Of the characters presented by the authors as synapomorphic for Cylapini + Vanniini only the ringlike buccula, tightly binding labial segment I (Namyatova et al. 2016: Figs 7A, B) and the distinctly elongate mandibular plate (Namyatova *etal*. 2016: 7A, B) are found exclusively in both groups not being found in other cylapines. More detailed phylogenetic and morphological studies of the subfamily Cylapinae are needed as indicated by Namyatova et al. (2016) to clarify the

relationship between Cylapini and Vanniini.

Concerning the characters herein presented as diagnostic for Cylapini the following features are present also in the Vanniini (*sensu* Namyatova et al. 2016):

i) Head hypognathous (Figs 9, 34, 92, 95, 108, 123, 148, 150; Namyatova et al. 2016: 7A, B).
ii) Vertex more or less sulcate along midline (Figs 8, 28, 33, 107, 120; Cassis et al. 2003: Fig. 2A; Konstantinov 2013: Fig. 4E; Namyatova et al. 2016: 5A, B).
iii) Frons vertical and flat, perpendicular to horizontal vertex.
iv) Posterior margin of maxillary and mandibular plates situated at the same line as middle of eye.
v) Mandibular plate distinctly elongate (Figs 9, 34, 92, 95, 108, 123, 148, 150; Namyatova et al. 2016: 7A, B).
vi) Ventral margin of eye not reaching base of mandibular plate.
vii) Buccula ringlike, binding labial segment I (Figs 6, 7, 9, 34, 56–65, 108, 123, 148, 150; Cassis et al. 2003: Figs 1A, 2AB; Konstantinov 2013: Figs 4D, E).
viii) Eye with short and sparse interocular setae and flat ommatidia (Fig. 124; Namyatova et al. 2016: Figs 7A, B).
ix) Antenna long, threadlike (Figs 2, 3, 36, 42, 45, 46, 52; Cassis et al. 2003: Figs 3A–D; Konstantinov 2013: Figs 1B, C).
x) Labial segments I and II not subdivided (Figs 9, 95, 125, 126, 150; Namyatova et al. 2016: Figs 9F, G).
xi) Pronotal collar distinct (Figs 8, 9, 28, 31, 33, 34; Namyatova et al.: Figs 5A, B).
xii) Genital capsule with dorsal wall short, much shorter than ventral wall, opening oriented upward (Figs 17, 134; Cassis et al. 2003: Figs 1H, 2F; Konstantinov 2013: Fig 2M).
xiii) Vestiture on dorsal surface of the body of left and right paramere absent (Figs 14, 16, 20, 22, 68, 70, 73, 75; Cassis et al. 2003: Figs 5A, B, 7A, B; Konstantinov 2013: Figs 2A–I).

Of these, only the features iii–v and vii seem to be found exclusively in Cylapini and Vanniini. Although hypognathous head is found also in all Bothriomirini, in Psallopini, and several representatives of Fulviini and Rhinomirini, in these taxa the frons is very gently sloping, not being perpendicular to the vertex, the maxillary and mandibular plates are projected forward with their posterior margin being situated at the same line as anterior margin of eye, and the mandibular plate is about the same size as maxillary plate (e.g. Wolski 2010: Fig. 5A; Wolski & Gorczyca 2012: Fig. 20; Wolski & Henry 2015: 6, 7; Namyatova et al. 2016: Fig. 7C). In most Cylapini and Vanniini, except for such genera as *Carvalhoma* Slater & Gross, 1977 and *Kanakamiris* Cassis & Monteith, 2006 the horizontal frons forms right or acute angle with flat and vertical frons (Figs 9, 34, 123, 148, 150; Konstantinov 2013: Fig. 4D, F; Namyatova et al. 2016: 7A, B). The mandibular and maxillary plates in most Cylapini and Vanniini are situated below eyes, their posterior margin located at the same line as middle of eye (Figs 9, 34, 123, 148, 150; Konstantinov 2013: Fig. 4D; Namyatova et al. 2016: Figs 7A, B).

Such characters as the eye with ventral margin not reaching base of the mandibular plate and the glabrous body of the parameres is found apart from Cylapini and Vanniini also in

Bothriomirini (Wolski 2013a: Figs 3D, 6B, C; Wolski & Gorczyca 2012: Figs 20, 49, 59, 62, 63, 81, 82, 100, 101). In members of Fulviini, Psallopini, and Rhinomirini the ventral margin of eye is reaching gula often wrapping around base of antenna (e.g. Moulds & Cassis 2006: Figs 1A–D; Wolski 2010: Figs 5A, 7A, 16A; Wolski & Henry 2015: 6, 7; Namyatova et al. 2016: Fig. 7C) and the body of both parameres is covered by setae (e.g. Stonedahl & Kovac 1995: Figs 10, 11, 13; Gorczyca 2002: Figs 1–8; Wolski 2010: Figs 8C, H).

The threadlike, long antenna, with segments III and IV longer than II is also found in the representatives of the tribe Rhinomirini (Gorczyca 2000; Wolski 2010: Figs 1, 2A, D, E–G, Q) and this character was presented by Gorczyca (2000) as synapomorphy for Cylapini + Rhinomirini. Another character occurring only in Cylapini, Vanniini, and Rhinomirini not found in other tribes is the more or less developed longitudinal sulcus along midline of vertex (Wolski 2010: Fig. 16A).

The labium with segment I undivided is present also in all Bothriomirini (Wolski, pers. observ.), the Rhinomirini belonging to the *Rhinocylapus* Poppius, 1909 group (sensu Wolski 2010) (Wolski, pers. observ.), and a few fulviines, such as genera *Hemiophthalmocoris* Poppius, 1912, *Xenocylapus* Bergoth, 1922, and *Henryfulvius* Wolski, 2015 (Wolski 2015: Figs 34, 35, 66; Wolski et al. 2016: Fig. 4B). In the Psallopini (Wolski & Henry 2015: Figs 18, 19), most fulviines (Wolski & Henry 2015: Figs 20–24), and Rhinomirini belonging to the *Rhinomiris* group (*sensu* Gorczyca & Chérot 1998) and the genera *Rhinomiriella* Gorczyca, 2001 and *Pararhinomiris* Gorczyca, 2003 the labial segment I is subdivided (Wolski & Henry 2015: Fig. 25; Wolski et al. 2017). The undivided labial segment II was also observed in *Bothriomiris* Kirklady, 1902 (Namyatova et al. 2016) and other Bothriomirini (Wolski, pers. observ.), rhinomirines belonging to the genus *Rhinocylapus* (Namyatova et al. 2016) and other representatives of the *Rhinocylapus* group (*sensu* Wolski 2010) (Wolski, pers. observ.) and some Fulviini. The subdivided labial segment II is common throughout the Fulviini having been observed among others in *Xenocylapus* (van Doesburg 1985: Fig. 5) and *Peritropis* Uhler, 1891 (Namyatova et al. 2016: 10A). It is found also in Psallopini (Namyatova et al. 2016: Fig. 10 C) and the rhinomirines belonging to *Rhinomiris* group (*sensu* Gorczyca & Chérot 1998) and the genera *Rhinomiriella* and *Pararhinomiris* (Wolski pers. observ.).

The Cylapini are best distinguished from the Vanniini by the setiform parempodia which in Vanniini are flattened, a character that is not found in other cylapines and is discussed among others by Gorczyca (1997), Cassis et al. (2003), and Namyatova et al. (2016). Namyatova et al. (2016) paid attention that the unguitractor plate with three narrow columns with acute lamellae of the central column (Figs 30, 79; Namyatova et al. 2016: Fig. 21E) occurs in all the examined cylapine taxa and are not found in *Vannius* complex and *Palaucoris* (Namyatova et al. 20E, 21D). These authors also noticed that of all the psallopine and cylapine taxa they examined, except *Vannius* complex, possess the asymmetrical parempodia (Namyatova et al. 2016: Figs 21E). In Cylapinae, however, the asymmetrical parempodia are present only in some, being in other taxa symmetrical, fully developed (Figs 30, 79, 133, 147), or reduced as shown by Wolski (2010: Fig. 16H).

The Cylapini and Vanniini can be also distinguished from each other based on the gula orientation, the shape of the collar (see above), the metathoracic scent gland evaporative area development (well developed, expanded onto lateral margin of metepisternum in Cylapini,

reduced to the ventral portion of metepisternum in Vanniini) (Figs 10, 32, 35, 93, 96, 129, 146, 149, 151; Cassis et al. 2003: Figs 1B, 2C; Konstantinov 2013: Fig. 4G; Namyatova et al. 2016: Figs 15D, E), and structure of the posterior margin of metepisternum (carinate in Cylapini, ecarinate in Vanniini) (Figs 10, 32, 35, 93, 96, 129, 146, 149, 151, arrow; Cassis et al. 2003: Figs 1B, 2C; Konstantinov 2013: Fig. 4G; Namyatova et al. 2016: Figs 15D, E).

The key provided below does not include three genera described by Carvalho (1982, 1989), i.e. *Duckecylapus* Carvalho, 1982, *Microcylapus* Carvalho, 1989, and *Valdasoides* Carvalho, 1989 as I did not have an access to specimens belonging to these genera. Based on the punctate dorsum (Carvalho 1982, 1989) *Duckecylapus* and *Valdasoides* would run to the couplet "3" of the key. *Duckecylapus* with long and erect setae seems to be most similar to *Valdasus*. *Valdasoides* is also similar to *Valdasus* in having the long and erect setae but it also has the raised metathoracic scent gland peritreme (Carvalho 1989) which may indicate its close similarity to *Cylapus* as diagnosed in this present paper. *Microcylapus* with the impunctate body would best run to the couplet "7" of the key. From other genera with smooth dorsum it can be distinguished by the convex basal portion of the hemelytral radial vein (Carvalho 1989).

Murphy & Polhemus (2012) and Namyatova & Cassis (2016) included the genera *Mangalcoris* Murphy & Polhemus, 2012 and *Carvalhoma* in the tribe Cylapini. Their placement was based mostly on the hypognathous head and long antenna (Namyatova & Cassis 2016). Both genera significantly differ, however, from other Cylapini by the frons that is very gently sloping, not being perpendicular to the vertex, the maxillary and mandibular plates are projected forward, situated at the same line as anterior margin of eye, and the mandibular plate is about the same size as maxillary plate (see above). The placement of these genera in Cylapini requires further investigations. Nevertheless, both genera are included in the key.

Key to genera of the tribe Cylapini of the world

1. Macropterous (Figs 1–7, 36–65). 2
– Staphylinoid (Carvalho 1948, Namyatova & Cassis 2016) or micropterous (Murphy & Polhemus 2012: Figs 1A–D). 10
2. Dorsal surface deeply and densely punctate (Figs 8, 28, 107, 127, 128, 150). 3
– Dorsal surface without punctures (Figs 31, 33). 7
3. Tarsomere I longer or nearly as long as tarsomeres II and III combined (Figs 94, 132); metathoracic scent gland peritreme strongly protruding, thin and arcuate, sharply pointed (Figs 93, 96, 129, 146, arrow). ..... ***Cylapus*** Say, 1832
– Tarsomere I shorter than tarsomeres II and III combined (Figs 11, 29); ostiolar peritreme moderately raised above surface of evaporative areas, relatively broad, blunt (Figs 32, 35, 149, 151, arrow), if peritreme is strongly raised, then it is weakly developed (*Amapacylapus*) (Fig. 10, arrow). 4
4. Eyes weakly pedunculate; mesoscutum broadly covered by posterior portion of pronotum (Fig. 28). ..... ***Cylapinus*** Carvalho, 1986
– Eyes strongly pedunculate (Figs 9, 95, 107, 120, 123, 148, 150); mesoscutum well exposed (Figs 1–8). 5

5. Corium with regular yellow pattern (see generic redescription for details) (Figs 1–5, 23–26); peritreme strongly raised above surface of evaporative areas, narrow (Fig. 10, arrow). ..... ***Amapacylapus*** Carvalho & Fontes, 1968
– Hemelytron uniformly brown to black with single patch medially; peritreme weakly raised above surface of metepisternum, broad, oval (Figs 149, 151, arrow). 6
6 Hemelytron covered with long, erect setae; mesepimeron and metepisternum punctate (Fig. 151). ..... ***Valdasus*** Stål, 1860
– Vestiture of hemelytron short, semierect; mesepimeron smooth (Fig. 149). .... ***Peltidocylapus*** Poppius, 1909
7. Vertex carinate posteriorly (Fig. 31). 8
– Vertex ecarinate posteriorly (Fig. 33). 9
8. Head as wide as posterior margin of pronotum. ..... ***Cylapoides*** Carvalho, 1952
– Head width 0.72–0.75 times shorter than posterior margin of pronotum. .... ***Corcovadocola*** Carvalho, 1948 (male)
9. Fore tibia cylindrical. ..... ***Cylapomorpha*** Poppius, 1914
– Foretibia flattened laterally. ..... ***Phyllocylapus*** Poppius, 1913
10. Micropterous (Murphy & Polhemus 2012: Figs 1A–D). ..... ***Mangalcoris*** Murphy & Polhemus, 2012
– Staphylinoid. 11
11. Hemelytron punctate (Namyatova & Cassis 2016: Fig. 1). .... ***Carvalhoma*** Slater & Gross, 1977
– Hemelytron impunctate. ..... ***Corcovadocola*** Carvalho, 1948 (female)

Amapacylapus Carvalho & Fontes, 1968

(Figs 1–26)

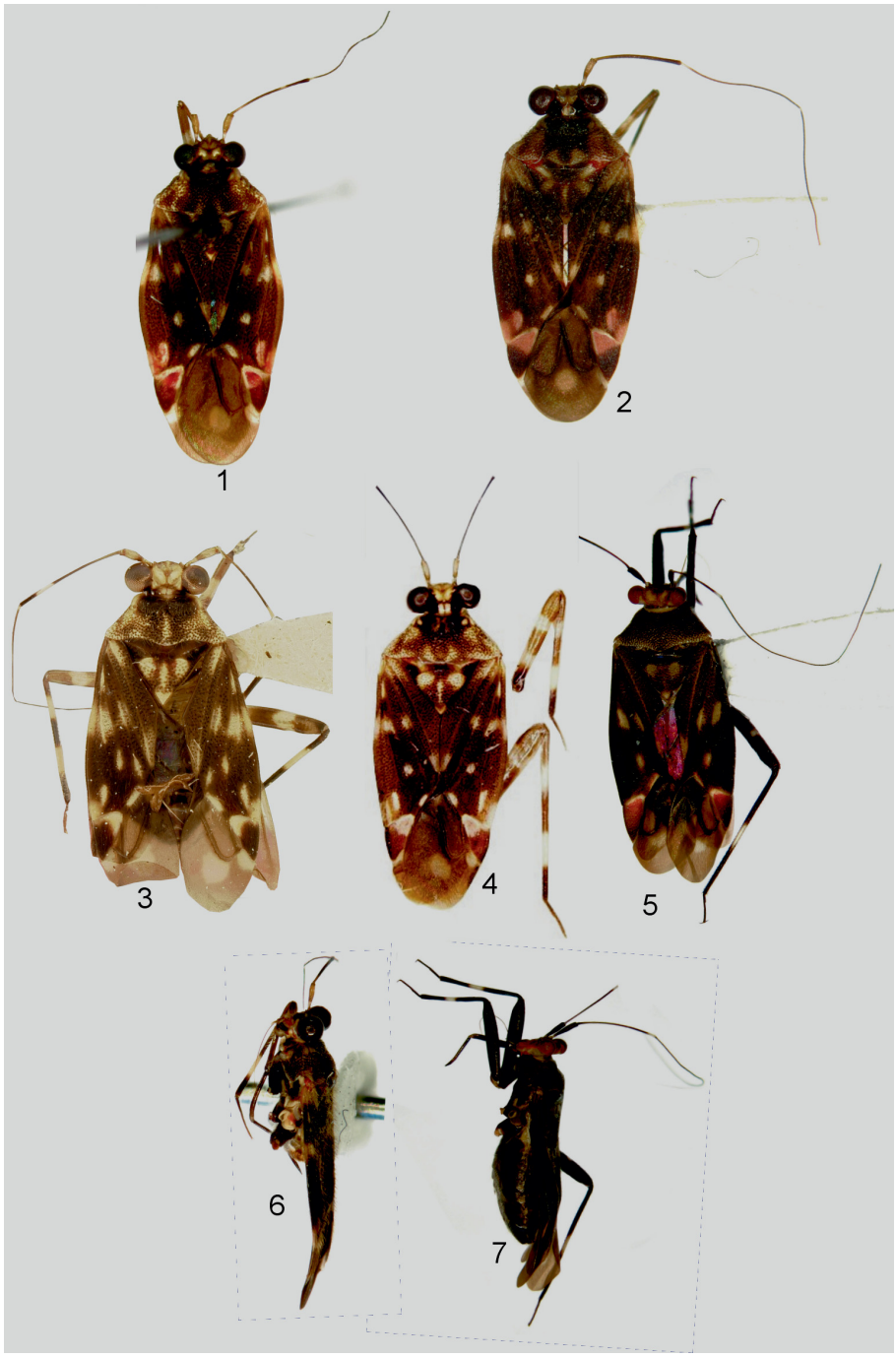
Amapacylapus Carvalho & Fontes, 1968: 279 (new genus). Type species: *Amapacylapus amapariensis* Carvalho & Fontes 1968 (original designation).

Amapacylapus: Carvalho & Froeschner (1987): 125 (list); Schuh (1995): 19 (catalog); Gorczyca (2000): 48 (list); Gorczyca (2006b): 13 (catalog); Schuh (2013) (online catalog); Namyatova et al. (2016): 5, 24, 32, 33 (as outgroup in phylogenetic analysis of the subfamily Bryocorinae).

Diagnosis. Recognized by the following set of characters: metathoracic scent gland with ostiolar canal broad, strongly raised above surface of evaporative area and peritreme narrow (Fig. 10, arrow); corium with regular yellow pattern (see generic description) (Figs 1–5); tarsomere I about two times shorter than tarsomeres II and III (Fig. 11); endosoma with one sclerite (Figs 12, 18).

Most similar to *Cylapus* (as diagnosed herein) in sharing the ostiolar canal strongly developed, raised above evaporative areas (cf. Fig 10 with Figs 93, 96, 108, 129, 146). It can, however, be distinguished by the reduced metathoracic scent gland peritreme (well developed in *Cylapus*) (cf. Fig 10 with Figs 93, 96, 108, 129, 146, arrow), the tarsomere I about two

Figs 1–7. Dorsal (1–5) and lateral (6–7) habitus photographs of the species of *Amapacylapus* Carvalho & Fontes, 1968: 1–2, 6 – *A. amapariensis* Carvalho & Fontes, 1968 (1 – ♀; 2, 6 – ♂); 3 – *A. englemani* Carvalho, 1991 (holotype, ♀); 4 – *A. labeculosus* (Bergroth, 1922) (holotype, ♀); 5, 7 – *A. unicolor* sp. nov. (paratype, ♀).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times shorter than tarsomeres II and III combined (tarsomere I as long as or longer from II and III combined in *Cylapus*) (cf. Fig 10 with Figs 94, 132), and by having of the endosoma with a single sclerite (usually at least two sclerites in *Cylapus*) (cf. Figs 12, 18 with Figs 66, 71, 80, 85, 97, 102, 110, 135, 140).

Redescription. Coloration. (Figs 1–7, 23–26). Dorsum dark brown with distinct yellow or dirty yellow areas. ***Thorax***. *Mesoscutum and scutellum*. Mesoscutum fuscous, often with two yellow stripes each situated laterally and contiguous with basolateral patches on scutellum; scutellum fuscous with two large, yellow patches each situated basolaterally, medial portion with longitudinal, yellow stripe, apex with yellow patch. *Hemelytron*. Dark brown to fuscous with yellow pattern, when fully developed composed of seven patches: one on basal portion of R+M vein (p1), two situated near base on exo- and endocorium (p2, 3), one situtated apically on endocorium (p4), one on outer, apical angle of exocorium (p5), one on inner, apical angle of endocorium bordering membrane (p6), and one on inner, apical angle of endocorium situated near apex of clavus (p7); clavus with yellow patch basally and apically; cuneus with more or less developed yellow patch on basal margin; membrane fuscous two yellow patches: one, larger situated medially, bordering or nearly bordering membrane major cell and other contiguous with inner margin of cuneus. *Legs*. Brown to black; tibiae with at least one, contrastingly yellow annulation.

Structure, texture and vestiture (Figs 1–11, 23–26). Macropterous. Body elongate oval; dorsum punctate, mixed with relatively long, dense, erect and semirecumbent setae. ***Head.*** Eyes strongly pedunculate; vertex ecarinate posteriorly, medial sulcus of vertex deep; antennal segment I shorter than width of head, narrowed basally, rest of the segment nearly cylindrical, weakly broadened medially; segment II about two times thinner than segment I, cylindrical. ***Thorax.*** *Pronotum*. Posterior margin convex medially. *Mesoscutum and scutellum*. Mesoscutum well exposed; scutellum moderately convex. *Thoracic pleura* impunctate, shiny, covered with sparse, long, erect setae; mesepimeral spiracle indistinct, surrounded by mushroom bodies; metathoracic peritreme strongly raised above evaporative areas, strongly reduced, ostiolar canal distinctly developed and raised above surface of evaporative areas, tubelike. *Hemelytron*. Outer margin moderately arcuate. ***Male genitalia*** (Figs 12–22). *Aedeagus* (Figs 12, 18). Endosoma strongly membranous with single sclerite; secondary gonopore broad, irregularly shaped, strongly serrate, directed upwards; sclerotized portion of ductus seminis inside endosoma short. *Right paramere* (Figs 16, 22) sickle shaped; apical process relatively long.

Discussion. Carvalho & Fontes (1968) recognized *Amapacylapus* based on the following characters: the presence of the furrow on the maxillary plate, thin antenna with sparse setae, short antennal segment I broadened toward apex, and strongly punctate body. These characters do not uniquely distinguish *Amapacylapus* as they are quite common among members of Cylapini. Examination of *A. amapariensis*, the type species, and two additional species, *A. englemani* Carvalho, 1991 and *A. unicolor* sp. nov. reveal there are two stable features that strongly indicate their close similarity and are here treated as diagnostic for *Amapacylapus*: hemelytron dark brown to black with regular yellow pattern composed of yellow patches situated on basal, medial, and apical parts of exo- and endocorium, apical part of clavus, and two patches on membrane: one bordering distal angle of major cell and other bordering inner margin of cuneus (Figs 1–5, 23–26, arrows) and peritreme narrow, strongly raised from the

surface of metepisternum (Figs 10, arrow). Identical coloration of the hemelytron is found in *Peltidocylapus labeculosus* (see holotype photo at Anonymous 2017 and reproduced in Fig. 4 of this paper). Careful examination of the metathoracic scent gland peritreme and other body elements of this type specimen were not possible. However, based on its strong resemblance to the type species of *A. amapariensis* it seems clear that *P. labeculosus* belongs to *Amapacylapus*. Thus, I propose to transfer this species from *Peltidocylapus* to *Amapacylapus*.

The hemelytral coloration is significantly different in two species, *A. nigricapitis* Carvalho, 1986 and *A. rondoniensis* Carvalho, 1986, included in *Amapacylapus* by Carvalho (1986). The type specimens of both species were unavailable for study but according to Carvalho (1986) the hemelytron is either entirely black (*A. rondoniensis*) or dark castaneous with costal fracture yellow (*A. nigricapitis*), and in both species the membrane is entirely fuscous which would exclude them from *Amapacylapus* as diagnosed in the present paper. Carvalho (1986) did not provide a detailed description of the metathoracic scent efferent system, mentioning only the distinctly raised ostiolar peritreme in *A. rondoniensis*; placement of *A. rondoniensis* and *A. nigricapitis* cannot be judged based on this body part.

Among the New World Cylapini only some members of three genera, i.e. *Cylapus* (as diagnosed in this paper), *Peltidocylapus*, and *Valdasus*, possess uniformly dark, dark brown to black coloration (e.g., Figs 36–38, 44, 45). According to Carvalho (1986: Fig. 4) the endosoma in *A. rondoniensis* and *A. nigricapitis* are devoid of sclerites. Taking this into account the placement of both species in *Cylapus* can possibly be excluded as most species have at least three distinct sclerites (Figs 66, 71, 80, 85, 97, 102, 110, 135, 140). Endosoma without sclerites can be found in most members of *Peltidocylapus* (Wolski, in prep.), which may indicate a placement of *A. rondoniensis* and *A. nigricapitis* in this genus. Detailed studies of specimens belonging to both species, including examination of the type specimens are required to confirm their generic affiliation.

Key to species of *Amapacylapus* Carvalho & Fontes, 1968

1. Corium with regular yellow pattern (Figs 1–5, 23–26); membrane fuscous with two distinct yellow patches: one larger, bordering or situated close to apical part of major cell and other contiguous with apex of cuneus (Figs 1–5, 23–26). 2
– Corium entirely dark castaneous or black; membrane uniformly fuscous (Carvalho 1986). 4
2. Yellow pattern on hemelytron fully developed, with two patches on inner, apical angle of endocorium (p6 and p7) (Figs 24, arrows). ..... ***A. englemani*** Carvalho, 1991
– Endocorium with only one yellow patch on inner, apical angle of endocorium (p6) (Figs 23, 25, 26, arrows). 3
3. Pronotum dark brown with narrow yellow stripe along posterior margin (Fig. 5). .... ***A. unicolor* sp. nov.**
– Pronotum dark brown with large yellow patches laterally and medially (Figs 1, 2). .... ***A. amapariensis*** (Carvalho & Fontes, 1968)
4. Hemelytron entirely black. ..... ***A. rondoniensis*** Carvalho, 1986
– Hemelytron dark castaneous with costal fracture yellow. .... ***A. nigricapitis*** Carvalho, 1986

Amapacylapus amapariensis Carvalho & Fontes, 1968

(Figs 1, 2, 6, 8–16, 23)

Amapacylapus amapariensis Carvalho & Fontes, 1968: 280, Figs 9–10 (new species); Carvalho (1982): 814, Figs 8–11 (description of male, male genitalia); Carvalho & Froeschner (1987): 139 (list); Schuh (1995): 19 (catalog); Gorczyca (2006b): 12 (catalog); Schuh (2013) (online catalog); Chérot & Carpintero (2016): 84 (record).

Type material (not examined). Holotype: ♀, "Rio Amapari, T. Amapá, III–64, J.M.C.col." (Museu Nacional, Rio de Janeiro, Brazil).

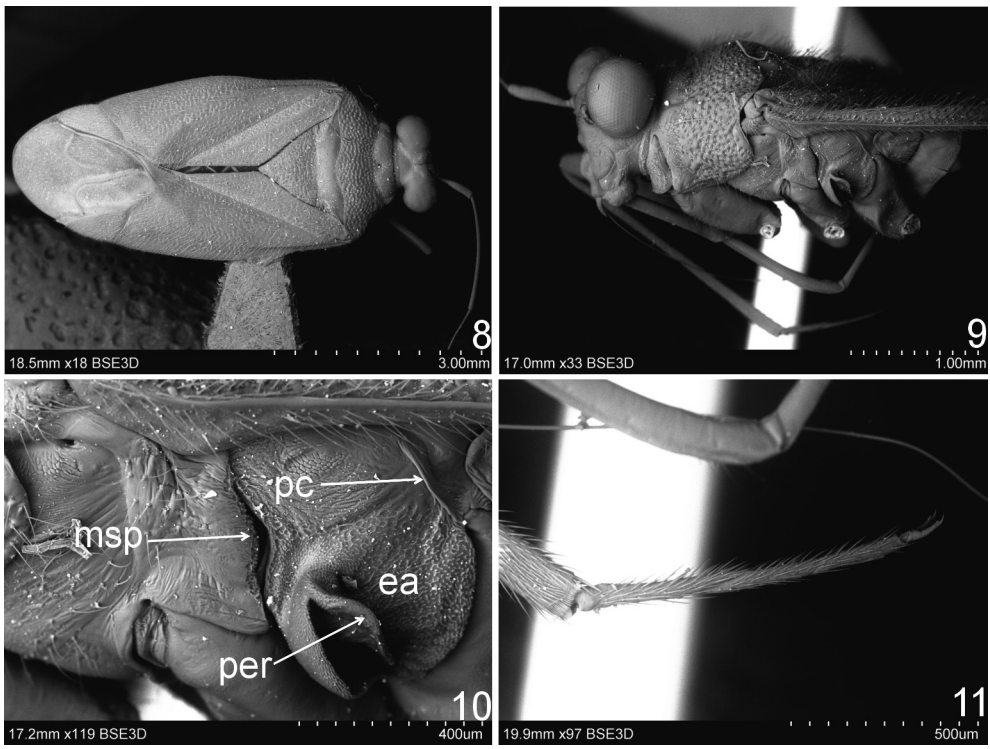
Additional specimens examined. ECUADOR: Orellana: ♂, "Napo, Res. Ethnica Waorani, 1 km S., Onkone Gare Camp, Trans. Ent., 4 Oct. 1996, 220 m, 00°39′10″S, 76°26′00″W, T.L. Erwin, et. al.; Insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest, Lot 1737, Trans. T–8" (USNM) (Fig. 1). **GUYANA: Potaro-Siparuni:** ♀, "Tumatumari, B.G. 1913" (AMNH) (Fig. 2).

Diagnosis. Recognized by the following set of characters: pronotum with irregular, longitudinal yellow patches laterally and medially (Figs 1, 2); yellow pattern on corium fully developed, without a patch on inner apical angle of endocorium, situated near apex of clavus (p7) (Fig. 23); male genitalia as described below and depicted in Figs 12–22.

Most similar to *A. englemani* in sharing pronotum with irregular, longitudinal yellow patches laterally and medially, and corium with fully developed yellow pattern (Figs 23, 24, arrows). It can be distinguished by the round corial patches (broad and elongate in *A. englemani*) and the lack of the yellow patch on inner apical angle of endocorium (p7) (Figs 23, 24).

Redescription. ***Female.*** (Composite description based on Carvalho & Fontes (1968) and the specimens mentioned below). **Coloration** (Figs 1–2, 6, 23). Dorsum dark brown with yellow and reddish areas. ***Head.*** Vertex blackish posteriorly, rest of vertex yellow, sometimes with brown or blackish, longitudinal tinge along medial sulcus; frons brown, tinged with yellow basally, medially and laterally; mandibular plate yellow red; maxillary plate blackish; buccula and clypeus yellow, tinged with brown; antennal segment I yellow; segment II brown with yellow annulation basally and sometimes also with yellow annulation near apex; segments III and IV dark brown; segments III with narrow, yellow annulation basally; labium dark brown black; segment I tinged with yellow medially. ***Thorax.*** *Pronotum* dark brown, broadly tinged with yellow laterally; posterior margin with two, relatively large, patches apically; collar dirty yellow. *Thoracic pleura* brown to dark brown with large, yellow areas; proepisternum yellow ventrally; proepimeron tinged with yellow; mesepimeron yellow ventrally and posteriorly; metepisternum with large, yellow patch on dorsal angle; metathoracic scent gland evaporative area and peritreme entirely white to pale yellow. *Mesoscutum and scutellum* dark brown; mesoscutum with large, yellow patch laterally; scutellum with three yellow patches: two basolaterally and one apically, medial portion of mesoscutum with yellow, longitudinal stripe along entire length. *Hemelytron* dark brown; corial yellow pattern fully developed except for patch situated on inner, apical angle of endocorium situated near apex of clavus (p7); yellow patches on apex of corium and embolium and on inner margin of cuneus tinged with red. *Legs*. Coxae dark castaneous; pro- and mesocoxae weakly tinged with yellow basally; remaining segments dark brown to black; femora and tibiae with yellow annulations.

Male. Similar to female in coloration, structure, texture, and vestiture. ***Male genitalia*** (Figs 12–16). *Aedeagus* (Fig. 12). Endosoma membranous, with serrate lobes laterally and apically; endosomal sclerite cylindrical, weakly tapering toward apex; secondary gonopore



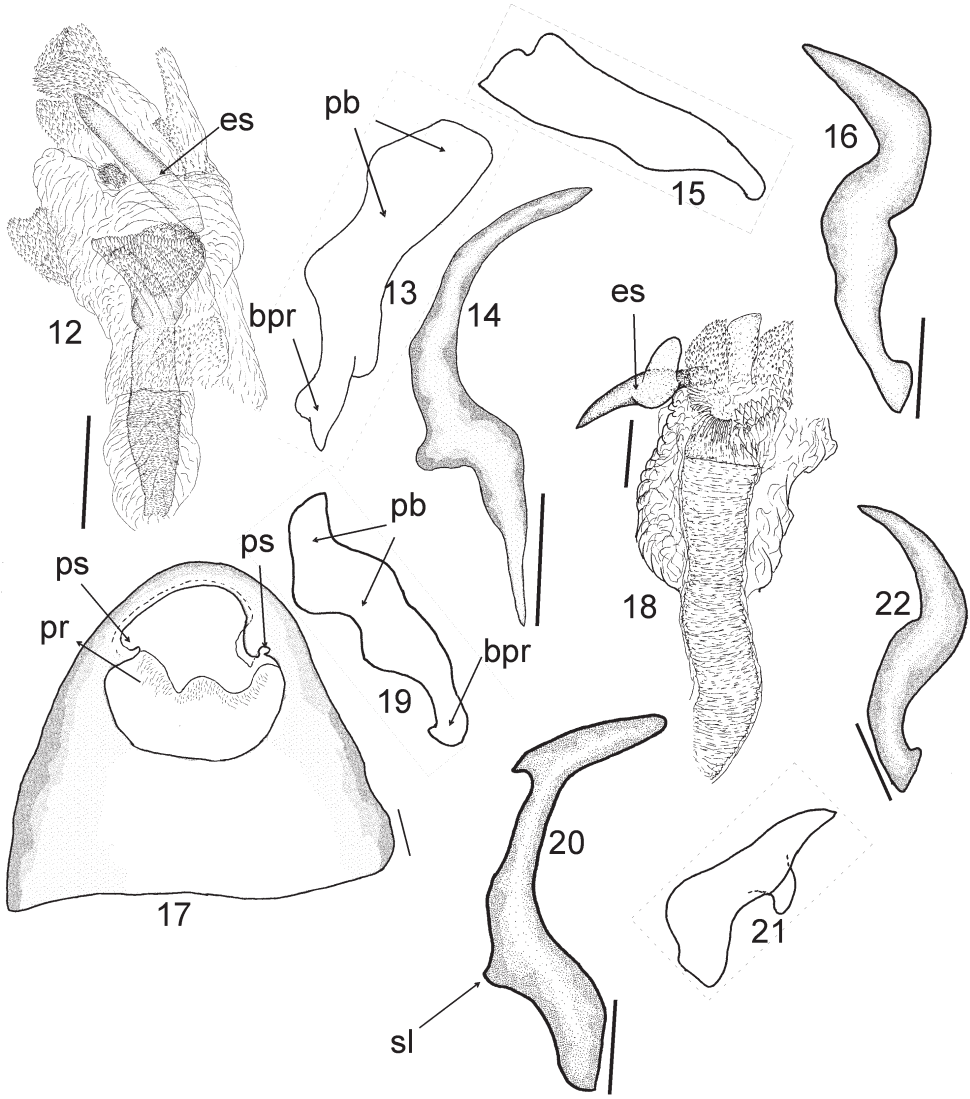
Figs 8–11. Scanning electron micrographs of *Amapacylapus amapariensis* Carvalho & Fontes, 1968: 8 – dorsal habitus; 9 – lateral view; 10 – thoracic pleura; 11 – protarsus. Abbreviations: ea = evaporative areas; msp = metathoracic spiracle; pc = posterior carina; per = peritreme.

clearly present, cuplike, with dentate aperture. *Left paramere* (Figs 13–15). Apical process thin, paramere body with inner margin arcuate and outer margin sinuate; sensory lobe well developed. *Right paramere* (Fig. 16). Apical process sharply pointed; paramere body curved.

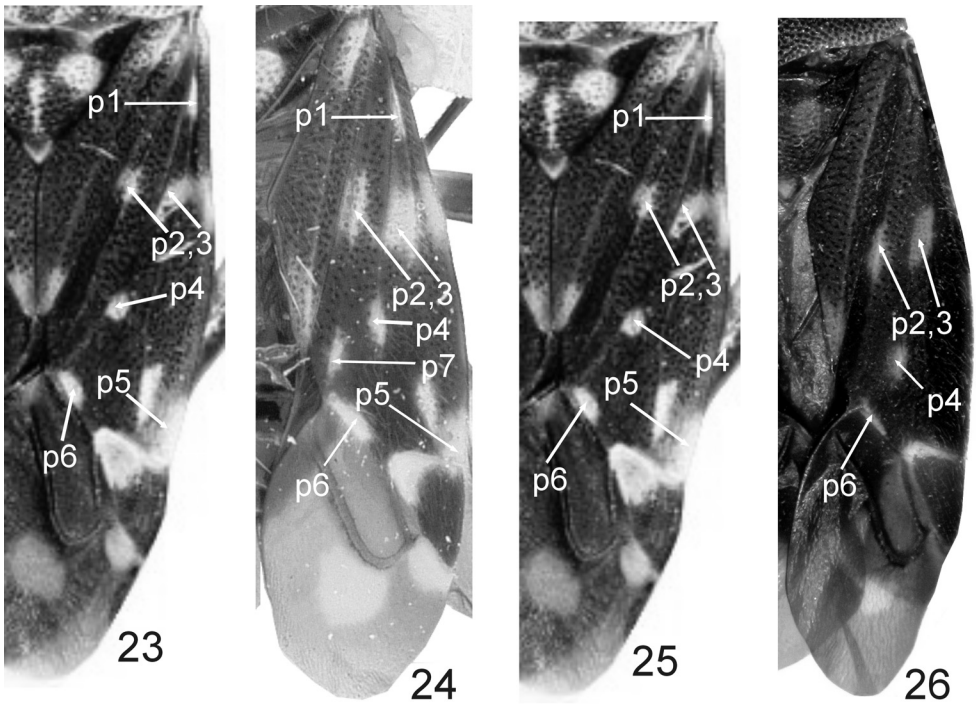
Measurements (in mm). ♂ / ♀ (*: holotype measurements). *Body*. Length: 5.50–6.20 / 6.20–6.60*, width 2.20–2.60 / 2.60*–3.00. *Head*. Length: 0.40–0.60 / 0.40*–0.63, width: 1.40–1.50 / 1.40*–1.48, interocular distance 0.45–0.48 / 0.50–0.52*. *Antenna*. Length of segment I: 0.50 / 0.40*–0.52, II: 1.60–1.70 / 1.60*–1.75, III: 2.50–2.60 / 2.80*, IV: 2.80* / 3.50–3.60. Length of segment I: 1.13, II: 1.10, III: – / 0.85, IV: – / 0.88. *Pronotum*. Length: 0.80–0.85 / 0.80*–0.85, width of anterior margin: 1.10 / 1.20, length of lateral margin: 0.85 / 0.85, width of posterior margin: 1.90–2.20 / 2.10*–2.30.

Biology. Collected using insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest.

Distribution. Brazil (Amapá, Amazonas) (Carvalho & Fontes 1968), Ecuador (this paper), French Guyana (Chérot & Carpintero 2016), Guyana (Potaro-Siparuni) (this paper).



Figs 12–22. Male genitalia of *Amapacylapus amapariensis* Carvalho & Fontes, 1968 (12–16) and *A. unicolor* sp. nov. (17–22): 12, 18 – endosoma; 13, 19 – left paramere (dorsal view); 14, 20 – left paramere (right lateral view); 15, 21 – apical process of left paramere; 16, 22 – right paramere (left lateral view); 17 – genital capsule. Abbreviations: bpr = basal process; es = endosomal sclerite; pb = paramere body; pr = proctiger; ps = paramere socket; sl = sensory lobe. Scale bars: 0.1 mm.



Figs 23–26. Hemelytron of the species of *Amapacylapus* Carvalho & Fontes, 1968. 23 – *A. amapariensis* Carvalho & Fontes, 1968; 24 – *A. englemani* Carvalho, 1991; 25 – *A. labeculosus* Bergroth, 1922; 26 – *A. unicolor* sp. nov. Abbreviations: p1–p7 = yellowish patches; pc = posterior carina; per = peritreme.

Amapacylapus englemani Carvalho, 1991

(Figs 3, 24)

Amapacylapus englemani Carvalho, 1991: 478, Fig. 2 (new species, by mistake as *Ampacylapus panamensis*); Carvalho & Froeschner (1994): 485 (list); Froeschner (1999) (catalog of Panamanian fauna); Schuh (1995): 19 (catalog); Schuh (2013) (catalog); Gorczyca (2006b): 13 (catalog).

Type material examined. PANAMA: Panamá: Holotype: ♀, "Fort Sherman, CS (Canal Zone, Panamá), 9º 20' N, 79º58'W, 2.VII.74, col. D. Engleman" (USNM) (Fig. 3).

Diagnosis. Recognized by the hemelytral yellow pattern fully developed, composed of the longitudinal patches (Figs 3, 24).

Most similar to *A. amapariensis* in having more than five yellow patches on corium (Figs 23, 24) and pronotum with yellow, irregular, longitudinal stripes laterally and medially (Figs 1–3). It can, however, be distinguished by the more broadly developed, longitudinal patches on hemelytron (round in *A. amapariensis*) (Figs 1–4, 23–25) and the presence of the yellow patch on inner apical angle of exocorium situated near clavus (p7). With *A. unicolor* it shares similar, broad and longitudinal hemelytral patches (Figs 3, 5, 24, 26) but

can be easily distinguished by the coloration of pronotum and fully developed pattern of hemelytron (Figs 3, 5, 24, 26).

Redescription. ***Female*. Coloration** (Figs 3, 24). ***Head*** yellow with large black areas; vertex yellow, weakly tinged with brown; frons mostly dark brown; clypeus mostly yellow, brownish apically; mandibular and maxillary plates yellowish brown; antennal segment I yellow with two brownish annulations, one situated basally, other apically; segment II mostly brown with whitish annulation subapically, blackish at apical one fifth; segments III and IV brown; labium yellow brown. ***Thorax.*** *Pronotum* dark brown with irregular, longitudinal patches laterally and medially. *Mesoscutum and scutellum*. Mesoscutum dark brown; scutellum with ground coloration dark brown with four large yellow patches: two situated basolaterally, one, longitudinal, situated medially, and one situated apically. *Thoracic pleura* dark brown yellow; metathoracic scent gland evaporative area whitish. *Hemelytron* yellow pattern fully developed with broad and elongate patches. *Legs*. Coxae castaneous with yellowish annulations: near base and apically; femora and tibiae dark brown with broad yellow annulations; tarsi brown. ***Abdomen*** mostly whitish with dark brown and brown areas.

***Male*.** Unknown.

Measurements (in mm). ♀ (holotype, based on Carvalho 1991). *Body*. Length: 5.80, width 2.40. *Head*. Length: 0.60, width: 2.00, vertex 0.56. *Antenna*. Length of segment I: 0.60, II: 2.00, III: 1.90, IV: 1.90. *Pronotum*. Length: 0.80, basal width 2.20.

Biology. Unknown.

Distribution. Panama (Colón) (Carvalho 1991).

Amapacylapus labeculosus (Bergroth, 1922), new combination

(Figs 4, 25)

Cylapus labeculosus: Bergroth, 1922: 4 (new species).

Cylapus (*Cylapus*) *labeculosus*: Carvalho (1957): 30 (catalog).

Peltidocylapus labeculosus: Carvalho & Fontes (1968): 276 (list); Schuh (1995): 32 (catalog); Schuh (2013) (catalog); Gorczyca (2006b): 18 (catalog).

Type material (not examined). BRAZIL: Amazonas: ♀, "Amazonas (Fonteboa)" (NHRS) (Fig. 4).

Remarks. *Amapacylapus labeculosus* is very similar to *A. amapariensis* in both having practically identical dorsal coloration (Figs 1, 2, 4, 23, 25) and body length and it seems very likely that they are conspecific. Further studies, including examination of the holotype of *A. labeculosus*, are needed to confirm or reject their synonymy.

Distribution. Brazil (Amazonas) (Bergroth 1922).

Amapacylapus unicolor sp. nov.

(Figs 5, 7, 17–22, 26)

Type material. Holotype: ♂, **ECUADOR: Orellana:** "Napo, Tiputini Biodiversity Station, 216 m, 0º37'55''S, 76º08'39''W, 5 Feb. 1999, T.L. Erwin et al. collectors; Insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest, Lot 2082, Trans. T–9" (USNM) (Fig. 5). Paratypes: ♂, **ECUADOR: Orellana:** "Napo, Tiputini Biodiversity Station, 216 m, 0º37′55″S, 76º08′39″W, 4 July 1998, T.L. Erwin et al. collectors; Insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest, Lot # 1861, Transect # T–7" (USNM); ♀, "Ecuador: Napo, Tiputini Biodiversity

Station, 216 m, 0º37′55″S, 76º08′39″W, 4 July 1998, T.L. Erwin et al. collectors; Insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest Lot # 1874, Transect # T–8" (USNM); ♀: "Ecuador: Napo, Tiputini Biodiversity Station, 216 m, 0º37′55″S, 76º08′39″W, 8 February 1999, T.L. Erwin et al. collectors; Insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest Lot # 2028, Transect # T–3" (USNM).

Diagnosis. Recognized by the following combination of characters: pronotum black with narrow, yellow stripe along posterior margin (Fig. 5); corial pattern reduced to four patches (see description) (Figs 5, 26); male genitalia as described below and depicted in Figs 17–22.

Most similar to *A. englemani* in having elongate patches on corium (Figs 3, 5, 24, 26). It can be easily distinguished by having the reduced corial pattern (fully developed in *A. englemani*) (Figs 3, 5, 24, 26).

Description. ***Male*****. Coloration** (Figs 3, 24). Dark brown to black with yellow or dark yellow and dark red areas. ***Head*** dirty yellow; vertex weakly tinged with red apically; rest of head broadly tinged with red; antenna blackish; segment II with narrow, yellow annulation apically; labium blackish. ***Thorax.*** *Pronotum* dark brown, posterior margin dirty yellow along entire length; collar dirty yellow. *Mesoscutum and scutellum* dark brown with three, relatively large, dirty yellow patches: two basolaterally and one apically. *Thoracic pleura* dark brown black; metathoracic scent gland evaporative area weakly tinged with dirty yellow. *Hemelytron* dark brown black with yellow to dirty yellow areas; yellow to dirty yellow pattern composed of elongated patches, lacking basal patch on exocorium (p1), apical patch situated on outer angle of exocorium (p5), and apical patch situated on inner angle of endocorium (p7); cuneus broadly tinged with red basally. *Legs*. Coxae dark castaneous; remaining segments of fore and middle leg black; mesofemur with yellow patch medially; fore and middle tibia with relatively broad, contrastingly yellow annulation medially. ***Male genitalia*** (Figs 17–22). *Aedeagus* (Fig. 18). Endosoma with secondary gonopore irregularly shaped; sclerite tapering toward apex, sharply pointed, base broadened, with ovoid appendage. *Left paramere* (Figs 19–21). Apical process with distinct spine posteriorly in dextrolateral view, in dorsal view with distinct spine medioventrally; paramere body with both margins strongly sinuate in dorsal view, when viewed dextrolaterally narrow, straight at apical two thirds, weakly curved at basal one third. *Right paramere* (Fig. 22). Paramere body and basal process curved.

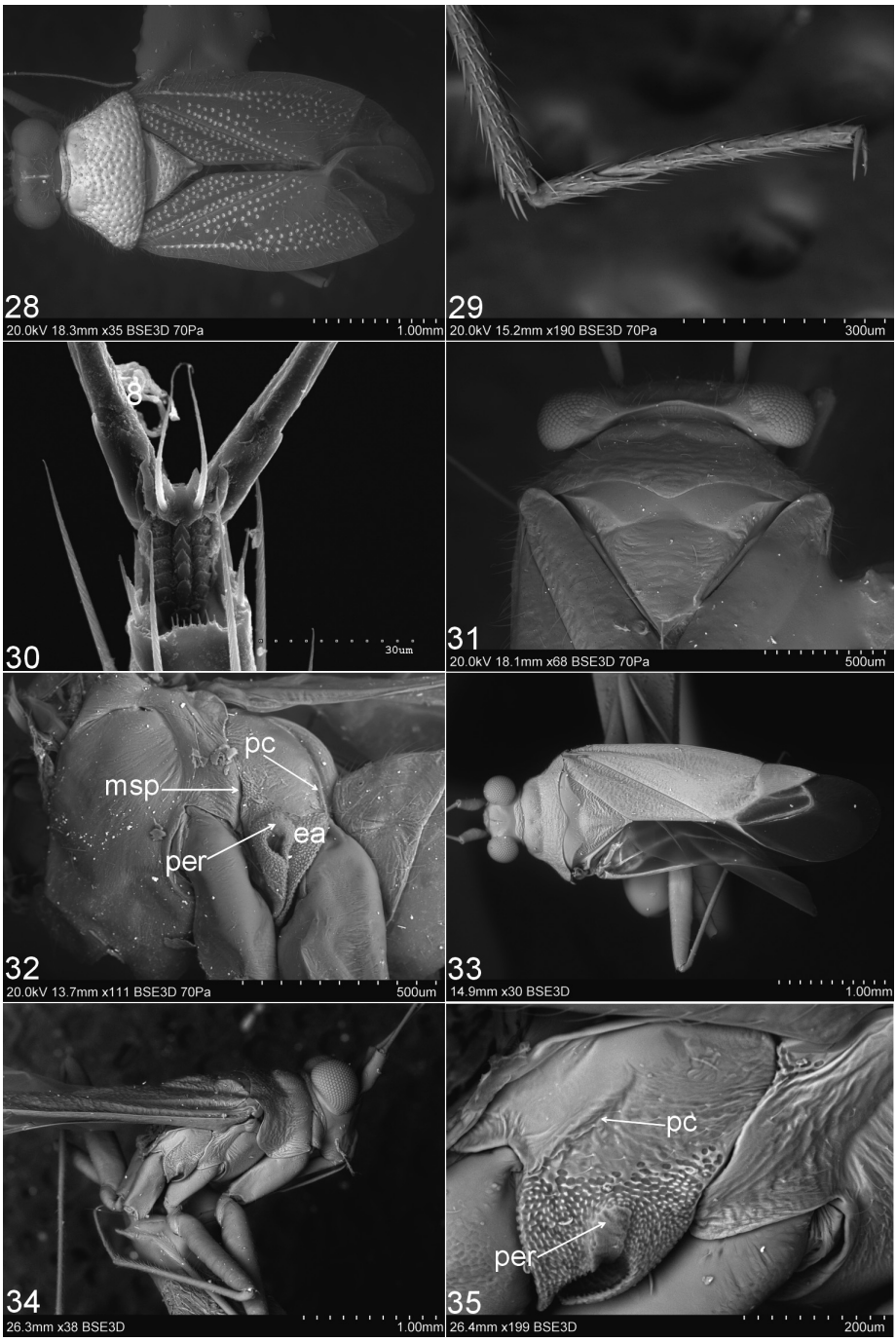
Female. Similar to male in structure, texture, and vestiture.

Measurements (in mm). ♂ / ♀ (*: holotype measurements): *Body*. Length: 6.60* / 6.60, width 2.50* / 2.80. *Head*. Length: 0.48* / 0.45, width: 1.30* / 1.33, interocular distance 0.65* / 0.62. *Antenna*. Length of segment I: 0.82* / 0.80, II: 2.20* / 2.30, III: 2.50* / 2.8, IV: 3.50* / 3.00. *Labium*. Length of segment I: 0.60* / 0.62, II: 0.68* / 0.72, III: 0.75* / 0.80, IV: 0.35* / 0.35. *Pronotum*. Length: 2.10* / 2.20, width of anterior margin: 1.15* / 1.10, length of lateral margin: 0.95* / 0.85, width of posterior margin: 0.90* / 0.95.

Etymology. The name *unicolor* is Latin adjective meaning "of single color, unicolorous" and is used to denote the uniformly dark brown pronotum with yellow stripe along posterior margin.

Biology. Collected using insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest.

Distribution. Ecuador (Orellana) (this paper).


28
20.0kV 18.3mm x35 BSE3D 70Pa
1.00mm
29
20.0kV 15.2mm x190 BSE3D 70Pa
300um
30
30um
31
20.0kV 18.1mm x68 BSE3D 70Pa
500um
pc
msp
ea
per
32
20.0kV 13.7mm x111 BSE3D 70Pa
500um
33
14.9mm x30 BSE3D
1.00mm
34
26.3mm x38 BSE3D
1.00mm
pc
per
35
26.4mm x199 BSE3D
200um

Cylapus Say, 1832

(Figs 36–147)

Cylapus Say, 1832: 26 (new genus). Type species: *Cylapus tenuicornis* Say, 1832 (designated by Poppius 1909).

Cylapus: Kirkaldy (1906): 134 (list); Poppius (1909): 3, 9, 10, 43 (diagnosis); Van Duzee (1916): 42 (list); Bergroth (1920): 70 (list); Blatchley (1926): 877 (list); Carvalho (1955): 22 (key to genera of Miridae), Carvalho (1957): 29 (catalog); Carvalho & Fontes (1968): 274 (key to genera, diagnosis); Henry & Wheeler (1988): 271 (catalog); Schuh (1995): 23 (catalog); Gorczyca (2000): 48; Gorczyca (2006b): 17 (catalog); Schuh et al. (2009): 17, 40–42 (phylogenetic analysis of Cimicomorpha); Jung & Lee (2012): 53, 56, 60, 61 (phylogenetic analysis of Miridae); Schuh (2013) (online catalog).

Trichocylapus Poppius, 1909: 11 (subgenus of *Cylapus*). Type species: *Trichocylapus clavicornis* Poppius, 1909 (by original designation).

Cylapus (*Trichocylapus*): Carvalho (1957): 31 (catalog).

Trichocylapus: Carvalho & Fontes (1968): 273, 282 (key to genera, diagnosis); Schuh (1995): 23 (catalog).

Cylapocerus Carvalho & Fontes, 1968: 274, 277 (new genus). Type species: *Cylapocerus antennatus* Carvalho & Fontes, 1968 (original designation), **new synonym.**

Cylapocerus: Carvalho & Froeschner (1987): 128 (list); Schuh (1995): 21 (catalog); Gorczyca (2000): 48 (list); Gorczyca (2006b): 14 (catalog); Cassis et al. (2003): 148, 150 (as outgroup in phylogenetic analysis of *Vannius* complex); Cassis & Monteith (2006): 21, 22 (as outgroup in phylogenetic analysis of *Vannius* complex); Schuh (2013) (online catalog).

Diagnosis. Recognized by the following set of characters: metathoracic ostiolar canal strongly raised above surface of evaporative areas, ostiolar peritreme strongly protruding, thin and arcuate, sharply pointed (Figs 93, 96, 108, 129, 146, arrow); tarsomere I as long as or longer than tarsomeres II and III combined (Figs 94, 132); endosoma with 2–4 endosomal sclerites (Figs 66, 71, 80, 85, 97, 102, 110, 115, 135, 140).

Most similar to *Amapacylapus*, *Peltidocylapus*, and *Valdasus* in sharing following combination of characters: dorsum distinctly punctate (Figs 8, 9, 23–26, 107, 127, 128, 148, 150), eyes strongly pedunculate (Figs 9, 92, 95, 108, 123, 148, 150), mesoscutum well exposed (Figs 1–5, 8, 36–55, 91, 107, 120; Carvalho & Fontes 1968). It can, however, be easily distinguished by the protruding, thin, arcuate, and sharply pointed ostiolar peritreme (Figs 93, 96, 108, 129, 146, arrow). With *Amapacylapus* it shares the metathoracic scent gland ostiole strongly raised above the surface of the evaporative area (Figs 10, 93, 96, 108, 129, 146) but it can be easily distinguished by the shape of the ostiolar peritreme.

Redescription. Coloration (Figs 36–65). Body brown to dark brown or black with dirty yellow, yellow, and red areas. **Structure, texture and vestiture** (Figs 36–65, 76–79, 91–96, 107–109, 120–134, 146, 147). Macropterous; body elongate; dorsum punctate, covered with rather long, erect and semirecumbent setae. ***Head.*** Vertex ecarinate posteriorly, its medial sulcation distinct and deep; eye strongly pedunculate; antennal segment II either thin, thinner than segment I or with basal portion thicker than segment I; labium thin, usually extending to metacoxae or so. ***Thorax.*** *Pronotum* calli moderately to well developed; posterior portion not covering mesoscutum. *Scutellum* flat to somewhat convex. *Thoracic pleura.* Proepisternum

Figs 28–35. Scanning electron micrographs of *Cylapinus minusculus* Carvalho, 1986 (28–30), *Cylapoides unicolor* Carvalho, 1952 (31–32), *Cylapomorpha michikoae* Yasunaga, 2000 (33–35): 28, 31, 33 – dorsal view; 29 – metatarsus; 30 – pretarsal structure; 32, 35 – thoracic pleura; 34 – lateral view. Abbreviations: ea = evaporative areas; msp = metathoracic spiracle; pc = posterior carina; per = peritreme.

impunctate; proepimeron impunctate at anterior one third, rest of proepimeron punctate; remaining pleura impunctate; mesepimeral spiracle indistinct, surrounded by mushroom bodies; posterior carina of metepisternum distinctly developed; metathoracic scent gland evaporative area broadly developed, oval. *Legs*. Coxae and femora covered with sparse, semirecumbent setae; tibiae covered with relatively dense, semirecubent setae which length is shorter than diameter of tibiae; tarsomere I longer than tarsomere II and III combined. ***Abdomen*** covered with relatively long, semirecumbent setae. ***Male genitalia*** (Figs 66–75, 80–89, 97–106, 110–119, 135–144). *Aedeagus* (Figs 66, 71, 80, 85, 97, 102, 110, 115, 135, 140). Endosoma with 2–4 sclerites; ductus seminis moderately thickened and short; sclerotized portion of ductus seminis inside endosoma well developed; secondary gonopore clearly present with dentate aperture. *Left paramere* (Figs 67–69, 72–74, 81–83, 86–88, 98–100, 103–105, 111–113, 116–118, 136–138, 141–143). Apical process without basal spine; paramere body without sensory lobe or with distinctly developed sensory lobe. *Right paramere* (Figs 70, 75, 84, 89, 101, 106, 114, 119, 139, 144). Apical process weakly developed, sensory lobe more or less developed.

Discussion. The present study reveals that the genera *Cylapus* and *Cylapocerus* have a set of features unique among Cylapini. These include the metathoracic scent gland peritreme strongly protruding, thin and arcuate, sharply pointed (Figs 93, 96, 108, 129, 146), the tarsomere I as long as or longer than tarsomeres II and III combined (Figs 94, 132), and the endosoma usually with three to four regularly shaped and positioned sclerites (Figs 66, 71, 80, 85, 97, 102, 110, 135, 140).

Carvalho & Fontes (1968) indicated that their newly described genus *Cylapocerus* can be distinguished from *Cylapus* by having the thickened antennal segment II, the labium reaching metacoxae, and the hemelytron covered by fine, erect setae. The present study, however, reveals that there are no differences in labium length and hemelytral vestiture between species treated by Carvalho & Fontes (1968) as belonging to *Cylapus* and the species included by Carvalho & Fontes (1968) and Carvalho (1989) in *Cylapocerus*. Only the thickened segment II in males is not found in *Cylapus* as treated by Carvalho & Fontes (1968). Given the strong similarity of *Cylapocerus* with *Cylapus* indicated above, both taxa clearly seem to be congeneric and the thickened antennal segment in males of *Cylapocerus* is here treated as insufficient to maintain its generic status. Similar sexual differences in the structure of the antennal segment II occurr mosaically among speciesis found elsewhere in Cylapinae. For example in the fulviine genus *Peritropis* in some species the antennal segment II is similar in shape in both sexes while in other species the segment II is somewhat thicker in males (Wolski & Henry 2012). In this paper, *Cylapocerus* is proposed as a junior synonym of *Cylapus* and all species previously placed in *Cylapocerus* are transferred to *Cylapus*.

Careful examination of two species, *Cylapus clavicornis* (Poppius, 1909) and *Cylapus festinabundus* Bergroth, 1922, reveals that they do not possess the abovementioned characters diagnostic for *Cylapus* and they clearly have features occurring in the genus *Peltidocylapus* (Wolski, in prep.). However, I defer transferring both species from *Cylapus* to *Peltidocylapus* until completion of my forthcoming treatment of *Peltidocylapus*.

I did not have an access to specimens belonging to *Cylapus brasiliensis* Carvalho, 1986, *C. famularis* (Stål, 1862), *C. funebris* (Distant, 1883), *C. nobilis* Poppius, 1909, and *C. rondoniensis* (Carvalho, 1991) and they are not treated in this paper. Their original descriptions do not

contain enough information on the characters treated here as diagnostic for *Cylapus* and thus their placement remains uncertain until specimens belonging to these species are investigated.

Key to the genus *Cylapus* Say, 1832

Cylapus clavicornis and *C. festinabundus* are not treated in this key as their placement in *Cylapus* is doubtful (see discussion under *Cylapus* for details). *Cylapus famularis* and *C. funebris* are also excluded from the key as specimens belonging to these species were unavailable for this study and the information coming from their original descriptions is insufficient in preparing of this key.

1. Pronotum without any stripe medially. 2
– Pronotum with stripe medially. 9
2. Antennal segment II in males strongly thickened, as wide as or wider than segment I (Figs 36, 38, 43, 55, 56, 57, 59, 60, 79, 92); lateral portion of pronotum red (Figs 57, 59, 60, 65), if not red then corium uniformly black (Fig. 36). 3
– Antennal segment II in both sexes thinner than segment I (Figs 40–42, 46–48, 50–53). 7
3. Pronotum entirely black, without red patch occupying its lateral portion (Fig. 56). .... ***C. amazonicus*** (Carvalho, 1989)
– Pronotum with large, red patch laterally (Figs 57, 59, 60, 65). 4
4. Pronotum with yellow stripes along its lateral margin (Figs 45, 60). .... ***C. marginicollis*** (Distant, 1883)
– Pronotum without yellow stripe along lateral margin (Figs 37–39, 43, 44, 54, 55). 5
5. Clavus entirely black, except of small yellow patch apically (Figs 37–39). .... ***C. antennatus*** Carvalho & Fontes, 1968
– Clavus with yellow stripe along its outer margin (Figs 43, 44, 54, 55). 6
6. Corium with transverse, yellow stripe medially (Figs 54, 55). .... ***C. tucuruiensis*** Carvalho, 1989
– Corium without transverse, yellow stripe medially (Figs 43, 44). .... ***C. luridus* sp. nov.**
7. Endosoma with two sclerites (Carvalho 1986: Fig. 16). .... ***C. brasiliensis*** Carvalho, 1986
– Endosoma with four endosomal sclerites (Figs 80, 102). 8
8. Head with vertex and basal portion of frons varying from yellow to brown, rest of head, except of yellow gula and posterior portion of maxillary plates and buccula black (Figs 40–42, 58); endosomal sclerites as depicted on Fig. 80. ..... ***C. citus*** Bergroth, 1922
– Head brown to dark red, medial portion of frons and clypeus usually fuscous (Figs 46, 47, 61); endosomal sclerites as depicted on Fig. 102. ..... ***C. ruficeps*** Bergroth, 1922
9. Corium (except extreme apex) without any yellow patches (Carvalho 1991: Fig. 3). ... . ***C. rondoniensis*** Carvalho, 1991
– Corium with at least two yellow patches medially (Figs 48–53). 10
10. Hemelytron with R+M vein tinged with yellow along entire length (Figs 50, 51). .... ***C. striatus*** Reuter, 1907
– Hemelytron with R+M vein not yellow (Figs 53, 53). ..... ***C. tenuicornis*** (Say, 1882)

Cylapus amazonicus (Carvalho, 1989) new combination

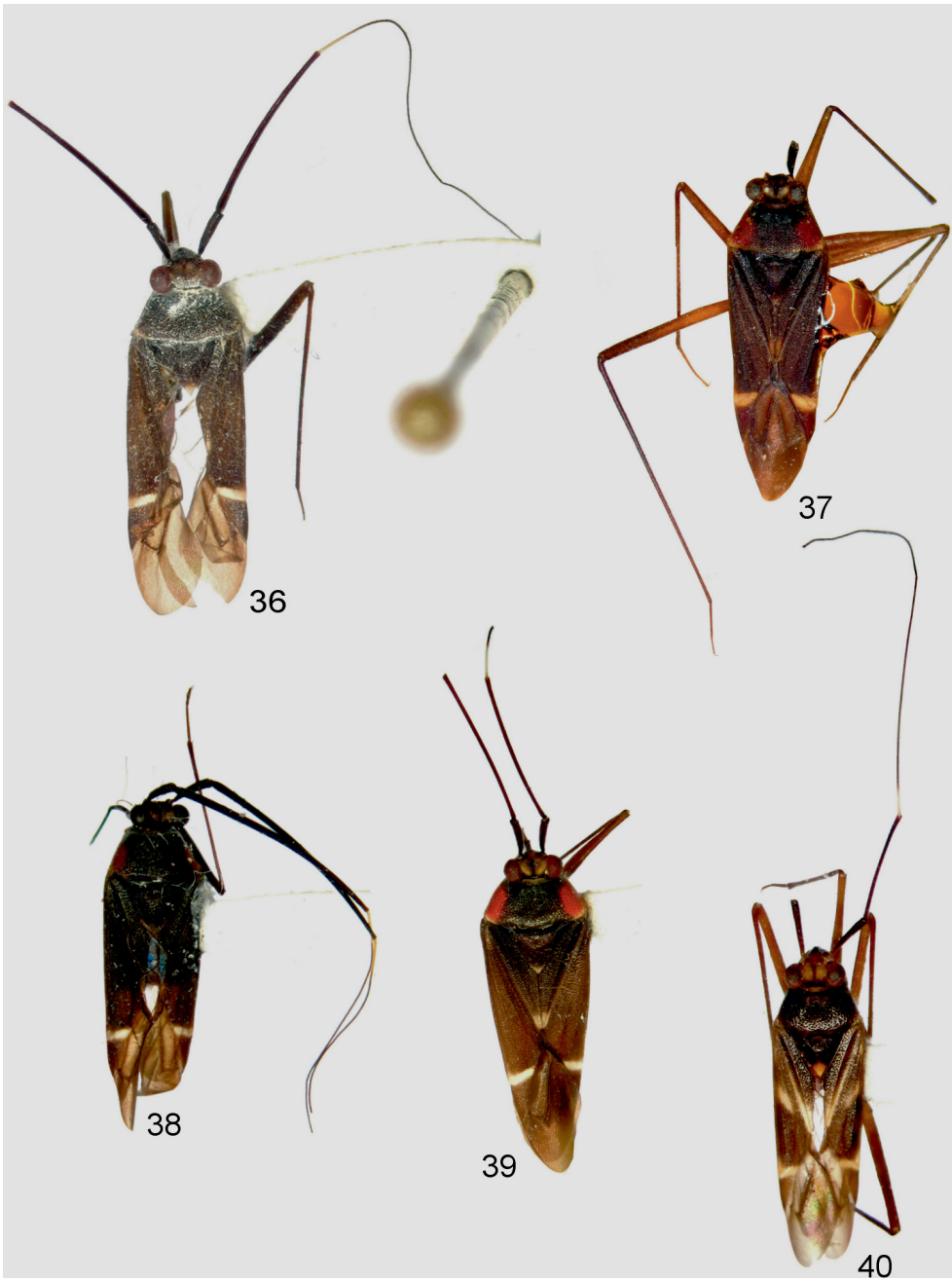
(Figs 36, 56, 66–70)

Cylapocerus amazonicus Carvalho, 1989: 82, Figs 5–6 (new species).
Cylapocerus amazonicus: Carvalho & Froeschner (1994): 489 (list); Schuh (1995): 21 (catalog); Gorczyca (2006b): 14 (catalog); Schuh (2013) (online catalog).

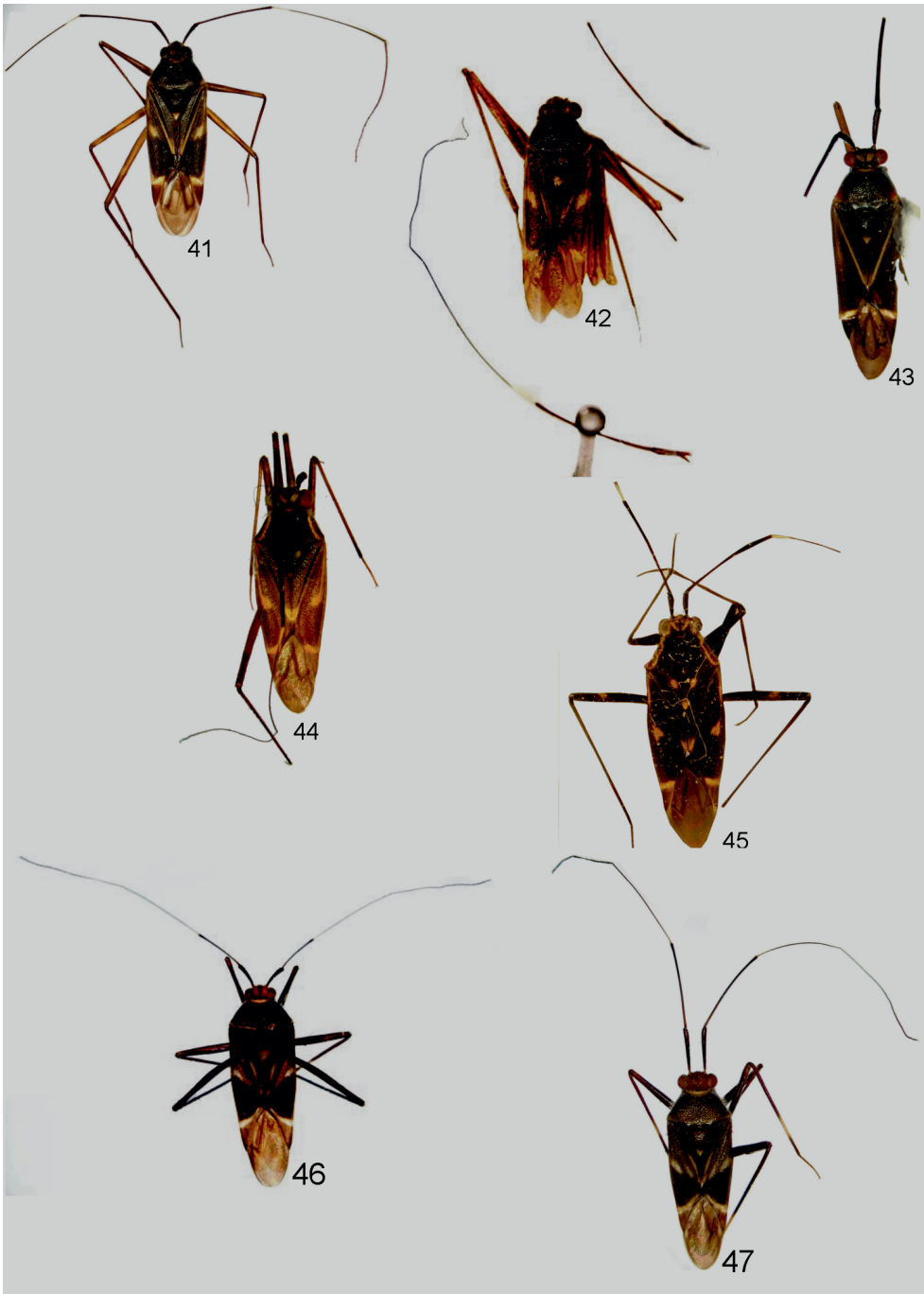
Type material (not examined). BRAZIL: Pará: Holotype: ♂, "Amazon River, Gurupá to Santarém, BRAZIL, September 16–17, 1930, Holt, Blake, & Agostini" (Museu Nacional, Rio de Janeiro, Brazil).
Material examined. BOLIVIA: Cochabamba: ♂ and ♀, "Sajta, XI–93, Chapare, Bolivia" (USNM). **ECUADOR: Orellana:** ♀, "Ecuador, Napo prov., Tiputini Biodiversity Stn., 216 m, 0º 37'55" S, 76º08'39 W, 21 October 1998, T.L. Erwin et al. collectors, ex mercury vapor light; Insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest, Lot 1985, Trans. T–9" (USNM); ♂, "Ecuador, Napo prov., Res. Ethnica Waorani, 1 km. S, Onkone Gare Camp, Trans. Ent., 3 July 1994, 220m, 00º39'10"S, 76 º26'00"W, T.L. Erwin, et al., insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest, At 3 x–trans, 19 m mark Proj. MAXUS Lot 762" (Fig. 36) (USNM).

Diagnosis. Recognized by the following set of characters: antennal segment II in males thicker than segment I (Fig. 36); pronotum entirely black except for small, white patches on humeral angle (Fig. 36); hemelytron entirely black except for tiny patch on apex of clavus (Fig. 36); endosoma with four sclerites: es1 short, cylindrical, relatively thin, without denticles at basal two thirds, apical one third globular, serrate, relatively broad; es2 long, cylindrical at basal two thirds, without denticle, weakly broadened at apical one third; es3 strongly tapering toward apex, sharply pointed, basal half without denticles, apical half serrate; es4 arcuate, sharply pointed, without denticles at basal half, serrate at apical half (Fig. 66); left paramere when viewed dorsally with sensory lobe distinctly developed (Fig. 67).

Most similar to *C. antennatus*, *C. luridus*, *C. marginicollis*, and *C. tucuruiensis* in sharing the tuberculate antennal segment II thicker than segment I in males (Figs 36, 38, 43, 55, 56, 57, 59, 60, 92). It can, however, be distinguished by the almost entirely black pronotum (red laterally in abovementioned species) (Fig. 36) and the shape of the male genitalia (Figs 66, 70). With *C. antennatus*, *C. luridus*, *C. marginicollis*, *C. ruficeps*, *C. stellatus*, and *C. tenuicornis* it shares the endosomal sclerites es1 and e2 broadened and serrate apically (Figs 71, 85, 97, 102, 110, 135) but can be distinguished by the es3 that is strongly tapering (Fig. 66).
Redescription. ***Male*** (composite description based on Carvalho 1989 and the specimens mentioned above). **Coloration** (Figs 36, 56). Dorsum castaneous to black, with weakly developed dirty yellow areas. ***Head*** black; basal portion of frons, maxillary plate, and buccula tinged with yellow; gula yellow; antenna varying from castaneous red to black; labium black. ***Thorax.*** *Pronotum* black; collar yellow; humeral angle narrowly dirty yellow. *Mesoscutum and scutellum* black; scutellum narrowly dirty yellow apically. *Thoracic pleura* black; metathoracic scent gland evaporative area yellow, tinged with fuscous. *Hemelytron* castaneous to black; apical margin of corium and basal margin of cuneus contrastingly yellow; membrane fuscous. *Legs*. Coxae and femora black; tibiae and tarsi dark brown. ***Abdomen*** black, tinged with dirty yellow ventrally. **Structure, texture and vestiture** (Figs 36, 56). Dorsum covered with relatively long, semirecumbent and erect setae. ***Head.*** Antennal segment II thicker than segment I, gradually becoming narrower toward apex, tuberculate. ***Thorax.*** *Pronotum*. Calli moderately developed. *Scutellum* moderately convex. ***Male genitalia*** (Figs 66–70). *Aedeagus* (Fig. 66). Endosoma with four sclerites (es1–es4): es1 short, cylindrical, relatively thin,



Figs 36–40. Dorsal habitus photographs of *Cylapus* species: 36 – C. *amazonicus* Carvalho, 1989 (♂); 37–39 – *C. antennatus* Carvalho & Fontes, 1968 (37 – ♂ holotype, 38 – ♂, 39 – ♀); 40 – *C. citus* Bergroth, 1922 (♂).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without denticles at basal two thirds, apical one third globular, serrate, relatively broad; es2 long, cylindrical at basal two thirds, without denticle, weakly broadened at apical one third; es3 strongly tapering toward apex, sharply pointed, basal half without denticles, apical half serrate; es4 arcuate, sharply pointed, without denticles at basal half, serrate at apical half. *Left paramere* (Figs 67–69). Paramere body arcuate; sensory lobe distinctly developed. *Right paramere* (Fig. 70). Apical process sharply pointed; paramere body with inner margin weakly sinuate, outer margin arcuate; sensory lobe moderately developed.

Female. Similar to male in coloration, structure, texture, and vestiture. ***Head.*** Antennal segment II thinner than segment I, weakly broadened apically.

Measurements (in mm). ♂ / ♀ (*: holotype measurements, taken from Carvalho 1989). *Body*. Length: 6.40–6.50 / 6.00*–6.60, width 2.10–2.40 / 2.00*–2.10. *Head*. Length: 0.60 / 0.40*–0.50, width: 1.20–1.34 / 1.20*–1.30, interocular distance 0.50–0.58 / 0.48*–0.55. *Antenna*. Length of segment I: 0.90 / 0.90*–1.10, II: 5.20 / 3.70–4.10, III: 4.00 / 3.25–3.60*, IV: 4.60 / 2.20*. *Labium*. Length of segment I: 0.60 / 0.75–0.78, II: 0.90 / 0.88–0.92, III: 0.70 / 1.12–1.20, IV: 0.30 / 0.50. *Pronotum*. Length: 1.90–2.15 / 0.80*–1.10, width of anterior margin: 1.10 / 1.15, length of lateral margin: 0.90–1.10, width of posterior margin: 1.90–2.15 / 1.80–2.10*.

Carvalho (1989) gave length of antennal segment II of the holotype as 1.0 mm, apparently by mistake.

Biology. Collected using insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest.

Distribution. Bolivia (Cochabamba) (this paper), Brazil (Pará) (Carvalho 1989), Ecuador (Orellana) (this paper).

Cylapus antennatus (Carvalho & Fontes, 1968) new combination

(Figs 37–39, 57, 71–77)

Cylapocerus antennatus Carvalho & Fontes, 1968: 279, Figs 5–8 (new species).

Cylapocerus antennatus: Carvalho & Froeschner (1987): 154 (list); Schuh (1995): 21 (catalog); Gorczyca (2006b): 14 (catalog); Schuh (2013) (online catalog).

Type material examined. BOLIVIA: La Paz: Holotype: ♀, "Bolivia – N[orth] Yungas, Caranavi; F. Dernier, V–31" (USNM) (Fig. 37).

Additional material examined. ECUADOR: Orellana: ♂, "Ecuador: Napo, Res. Ethnica Waorani, 1 km S. Onkogone Gare Camp, Trans. Ent., 8 Feb. 1996, 220 m, 00º39′10″S, 76º26′00″W, T.L. Erwin, et al.; Insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest, Lot 1467, Trans. T–7" (USNM); ♂, "Ecuador: Napo, Tiputini Biodiversity Station, 216 m, 00º37′55″S, 76º08′39″W, 5 July 1998, T.L. Erwin et al., collectors; Insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest, Lot # 1894, Transect # T–10" (USNM) (Fig. 38); ♀, "Ecuador: Napo, Res. Ethnica Waorani, 16 km S. Onkone Gare Camp, Trans Ent., 21 June 1994, 220 m, 00º39′10″S; 76º26′00″W, T. L. Erwin, et al.; Insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest. At 9 x–trans. 1, 89 m mark. Project Maxus, Lot 719" (Fig. 39) (USNM).

Figs 41–47. Dorsal habitus photographs of *Cylapus* species: 41, 42 – *C. citus* Bergroth, 1922 (41 – ♀, 42 – holotype); 43 – *C. luridus* sp. nov. (♂ holotype); 44, 45 – *C. marginicollis* (Distant, 1883) (44 – ♂, 45 – ♀); 46, 47 – *C. ruficeps* Bergroth, 1922 (46 – ♂ holotype, 47 – ♀).

Diagnosis. Recognized by the following set of characters: antennal segment II in males thicker than segment I (Figs 38, 57, 76); lateral portion of pronotum broadly tinged with red (Figs 37–39, 57); hemelytron entirely fuscous with indistinct patch on apex of clavus (Figs 37–39); endosoma with four sclerites (es1–es4): sclerites es1 and es3 clublike and serrate at broadened parts; es1 with basal one third about four times thinner than apical two thirds; es3 with basal half about two times thinner that apical half; es2 ellipsoid, entirely serrate; es4 arcuate, sharply pointed (Fig. 71).

Most similar to *C. amazonicus*, *C. luridus*, *C. marginicollis*, and *C. tucuruiensis* in sharing segment II in males thicker than segment I (Figs 36, 38, 43, 55, 56, 57, 59, 60, 92). It can, however, be distinguished by the shape of the male genitalia (Figs 66–75, 85–89, 97–101, 110–114, 140–144).

Redescription. *Male*. Coloration (Figs 37–39, 57). Black with red and yellow areas. ***Head*** mostly black with brown and dirty yellow areas; vertex dark brown with dirty yellow stripe along internal margin of eye; antenna varying from dark castaneous to black; segment III with broad, yellowish annulation basally; labium varying from dark brown to black. ***Thorax***. *Pronotum* black, broadly tinged with red laterally; humeral angle narrowly tinged with yellow. *Mesoscutum and scutellum* black, narrowly yellow apically. *Thoracic pleura*. Proepisternum black; proepimeron narrowly black anteriorly and ventrally, rest of proepimeron red; mesepimeron with yellow stripe along posterior margin; metathoracic scent gland evaporative areas yellow, broadly tinged with fuscous. *Hemelytron* black; clavus with narrow patch apically; apical margin of corium and basal margin of cuneus yellow; membrane dark fuscous. *Legs*. Coxae dark castaneous to black; remaining segments dark brown black. **Structure, texture and vestiture** (Figs 37–39, 57, 76–77). Dorsum covered with relatively long, semirecumbent and erect setae. ***Head.*** Antennal segment II thicker than segment I, gradually becoming narrower toward apex. ***Thorax.*** *Pronotum.* Calli moderately developed. *Scutellum* moderately convex. ***Male genitalia*** (Figs 71–75). *Aedeagus* (Fig. 71). Endosoma with four sclerites (es1–es4): sclerites es1 and es3 clublike and serrate at broadened parts; es1 with basal one third about four times thinner than apical two thirds; es3 with basal half about two times thinner than apical half; es2 ellipsoid, entirely serrate; es4 arcuate, sharply pointed. *Left paramere* (Figs 72–74). Apical process arcuate; paramere body with inner margin arcuate and outer margin sinuate; sensory lobe strongly developed. *Right paramere* (Fig. 75). Apical process short, obtuse; paramere body with inner and outer margins sinuate; sensory lobe moderately developed; basal process short.

Female. Similar to male in coloration, structure, texture, and vestiture. ***Head.*** Antennal segment II thinner than segment I, weakly broadened apically.

Measurements (in mm). ♂ / ♀ (*: holotype measurements). *Body*. Length: 7.00–7.70* / 7.60, width 1.80*–2.10 / 2.30. *Head*. Length: 0.40*–0.62 / 0.60, width: 1.40*–1.42 / 1.42, interocular distance 0.52*–0.58 / 0.58. *Antenna*. Length of segment I: 1.00*–1.38 / 1.20, II: 5.20*–5.45 / 8.35, III: 2.75 / missing; IV: 4.65–5.20* / missing. *Labium*. Length of segment I: 0.78–0.82 / 0.95, II: 0.92–0.95 / 0.98, III: 1.14–1.20 / 1.30, IV: 0.30–0.33 / 0.33. *Pronotum*. Length: 1.10–1.12* / 1.10, width of anterior margin: 1.30–1.35* / 1.35, length of lateral margin: 1.10* / 1.10, width of posterior margin: 2.10–2.15* / 2.40.

Biology. Collected using insecticidal logging of mostly bare green leaves, some with covering of lichenous or bryophitic plants in terre firme forest.
Distribution. Bolivia (La Paz) (Carvalho & Fontes 1968), Ecuador (Orellana) (this paper).

Cylapus citus Bergroth, 1922

(Figs 40–42, 58, 78, 79, 80–84)

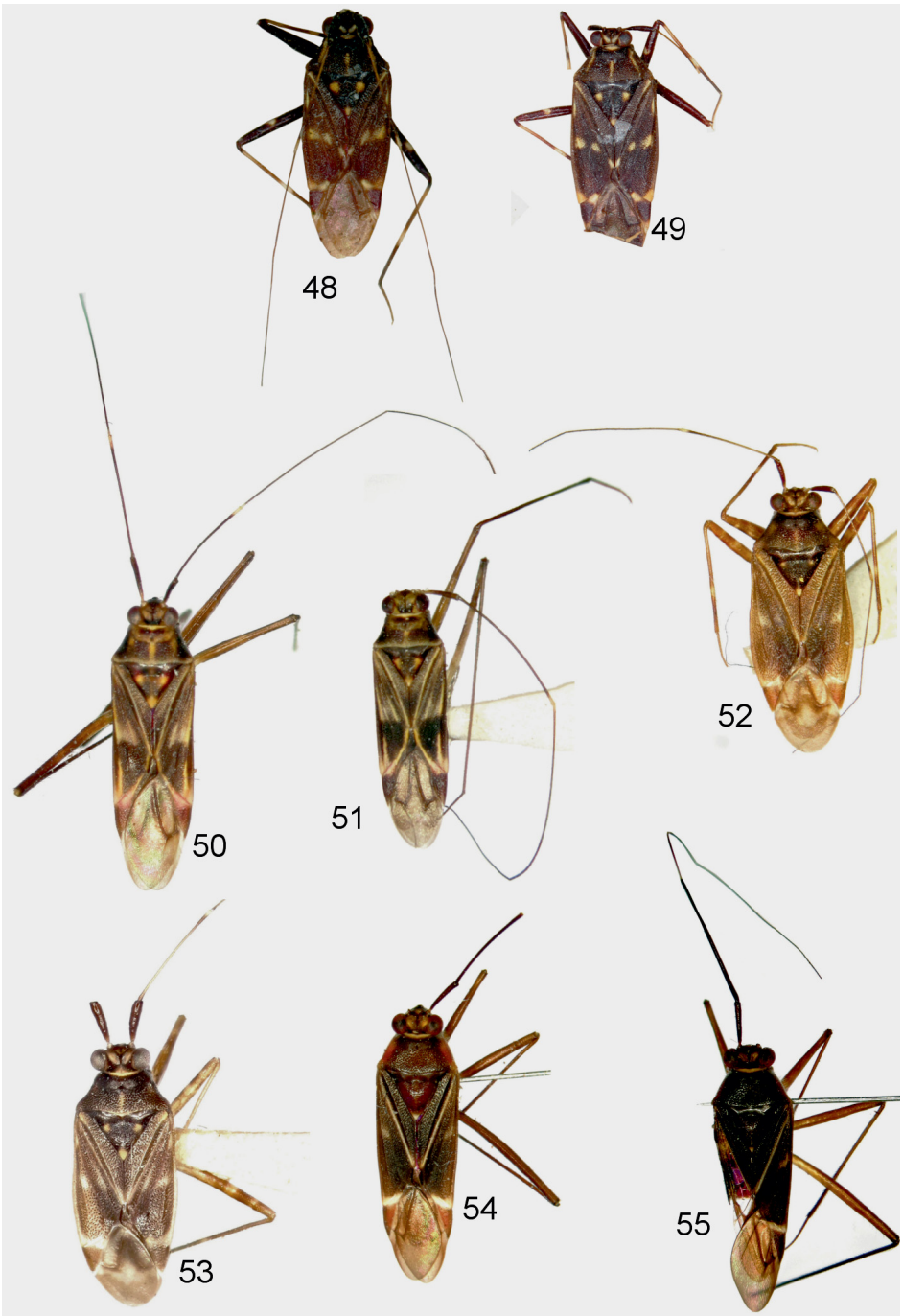
Cylapus citus Bergroth, 1922: 1 (new species).
Cylapus citus: Carvalho & Fontes (1968): 274 (list); Schuh (1976): 20, Fig. 37 (discussion, pretarsal structure); Schuh (1995): 23 (catalog); Kerzhner & Konstantinov (1999): 121, 122, Fig. 10 (male genitalia); Gorczyca (2006b): 16 (catalog); Schuh (2013) (online catalog).
Cylapus (*Cylapus*) *citus:* Carvalho (1957): 29 (catalog).

Type material (not examined). Holotype: **BRAZIL: Amazonas:** ♀, "Upper Amazonas (*Olivença*)" (Fig. 42) (NHRS). **Additional material examined. BOLIVIA: La Paz:** 1 ♂, "Tumupasa, Boliv[ia], xii, W M. Mann; Mulford Biol. Expl. 1921–1922; Carvalho to Drake Coll. 1993; 1 ♀, Bolivia, Uyapi, Guanay, ?–10–1993, G. Arriagada leg." (USNM). **BRAZIL: Amazonas:** 1 ♀, "Tefe, Amazonas, Brasil, 27 a 31–VII–1956, M. Álvarenga legit; Coleção Campos Seabra; Carvalho to Drake Coll. 1993" (USNM). **Rondônia:** ♂, "Brazil: *Rondônia*, 62 km SW Ariquemes near Fzda. [= farm] Rancho Grade 3–15–XII–1996 JE Eger, Collected at night; C. J. Drake Eger Accession 1997" (USNM); 1 ♂3 ♀♀, "Brazil: *Rondônia*, 62 km SW Ariquemes near Fzda. [= farm] Rancho Grade 4–16–XI–1997 JE Eger, Collected at night; C. J. Drake Eger Accession 1998" (USNM); 1 ♂, "Brazil: *Rondônia*, 62 km SW Ariquemes, nr Fzda. Rancho Grande, 30–III–10–IV–1992, J. E. Eger, Coll." (USNM) (Fig. 40). **GUYANA: Cuyuni-Mazaruni:** 1 ♂, "Guyana: Mazaruni: Potaro District, Takutu Mountains, Takutu Lumber Camp, 6°15'N, 59°, 00' W, 30 December 1982; W. E. Steiner, J. E. Lowry & G. L. Williams collectors" (USNM). **PERU: Huánuco:** 1 ♀, "Peru, Panguana, Dept. Huanuco, Rio Llullapichis, Nebenfluß des Rio Pachitea, 9°37'S, 74°56'W, 260 m, 23.XI.2008–11. XII.2008, leg. K. Schönitzer, F. Glaw & F. Wachtel" (ZSMC). **Junin:** 2 ♂♂ 1 ♀, "Peru: Junin: San Rámon de Pangoa, 40 km S, Satipo, 750 meters, January 29, 1974, R.T. Schuh; PERU: Junin: San Ramón de Pangoa, 40 km S, Satipo, 750 meters, January 29, 1974, R.T. Schuh" (AMNH); 1 ♀, "Satipo, Peru, XI.17.1947, P. Paprzycki; 249; J.C. Lutz Collection 1961" (USNM). **Loreto:** 1 ♂ 1 ♀ (on one pin), "Peru, Loreto, IV, 70, B. Malkin; Carvalho to Drake Coll. 1993" (USNM); 2 ♀♀ (on one pin), "Peru, Loreto, IV, 70, B. Malkin" (USNM). **Madre de Dios:** 2 ♀♀, "*Perú*, D[e]p[ar]t[ament]o Madre de Dios, Prov[invincia] Manu – Pakitka, C.S. Carbonell 22–V–16" (AMNH) (Fig. 41).

Diagnosis. Recognized by the following set of characters: antennal segment II thinner than segment I (Figs 40–42); pronotum black except for yellow patch on humeral angle (Figs 40–42); corium with yellow, large, oblique patch medially (Figs 40–42); endosomal sclerite es1 long, with basal two thirds tapering toward apex, apical one third broadened, extreme apex serrate; es2 short, broad, cylindrical, tapering toward apex at apical one sixth; es3 long, strongly tapering toward apex, sharply pointed; es4 long, weakly arcuate, slightly tapering toward apex, sharply pointed (Fig. 80).

Most similar to *C. ruficeps* in sharing large, oblique patch medially (Figs 40–42, 46, 47). It can, however, be distinguished by the head coloration and the shape of the male genitalia (Figs 80–84).

Redescription. ***Male*** (composite description based on Bergroth 1922 and the specimens mentioned below). **Coloration** (Figs 40–42, 58). Dorsum black with yellow areas. ***Head.*** Vertex and basal portion of frons varying from yellow to brown; rest of head, except of yellow gula and posterior portion of maxillary plates and buccula black; antenna dark castaneous to black; segment III with narrow, yellow annulation basally; labium black. ***Thorax.*** *Pronotum* black, except for yellow humeral angle. *Mesoscutum and scutellum* black; scutellum yellow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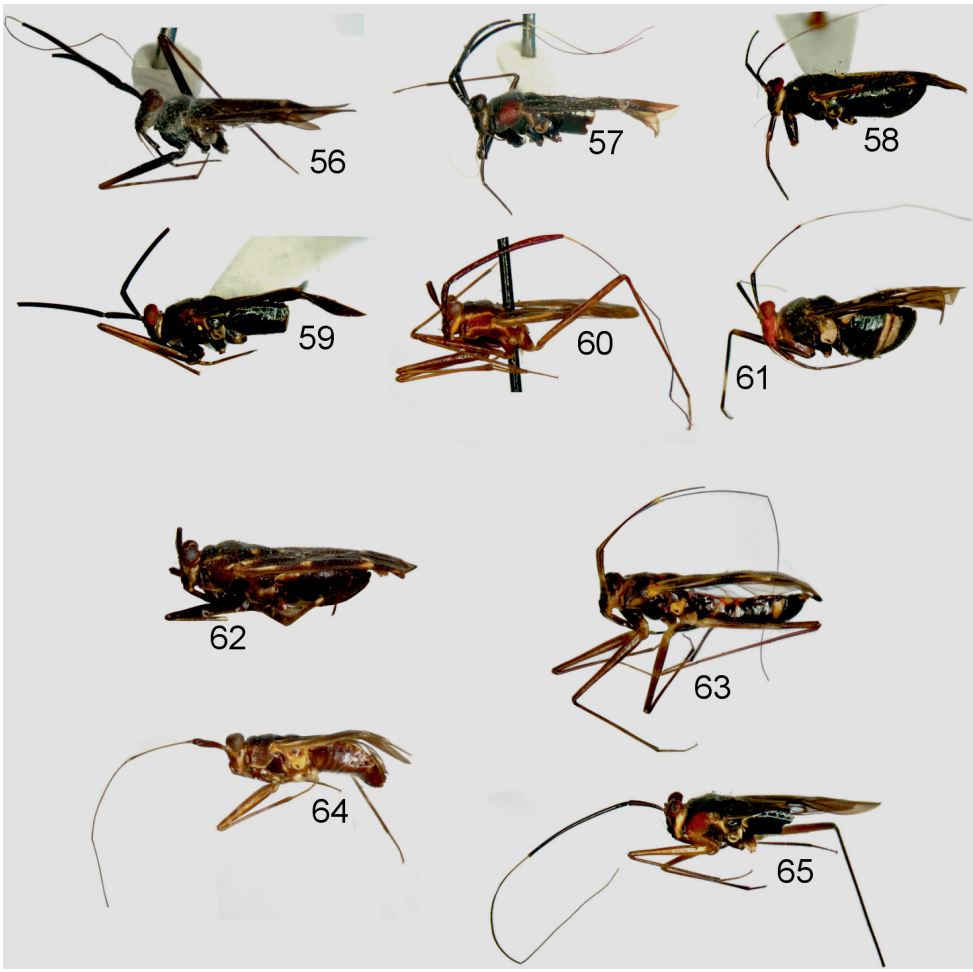
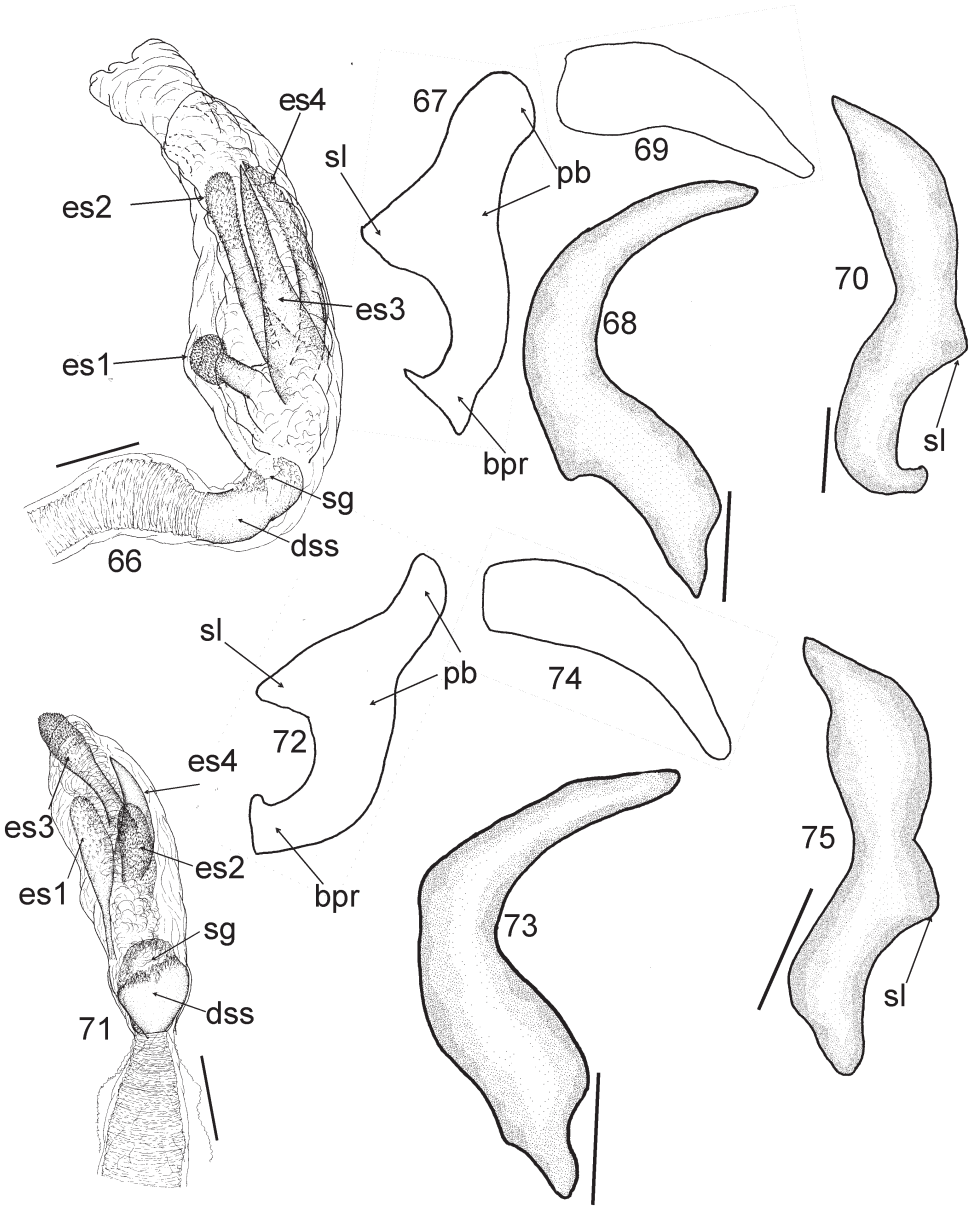


Figs 56–65. Lateral view of *Cylapus* species: 56 – *C. amazonicus* Carvalho, 1989 (♂); 57 – *C. antennatus* Carvalho & Fontes, 1968 (♂); 58 – *C. citus* Bergroth, 1922 (♀); 59 – *C. luridus* sp. nov. (♂); 60 – *C. marginicollis* (Distant, 1883) (♂); 61 – *C. ruficeps* Bergroth, 1922 (♀); 62 – *C. stellatus* (Distant, 1883) (♀); 63 – *C. striatus* Reuter, 1907 (♀); 64 – *C. tenuicornis* (Say, 1832) (♂); 65 – *C. tucuruiensis* Carvalho, 1989 (♂).

Figs 48–55. Dorsal habitus photographs of *Cylapus* species: 48, 49 – *C. stellatus* (Distant, 1883) (48 – ♂ paralectotype, 49 – ♀ lectotype); 50, 51 – *C. striatus* Reuter, 1907 (50 – ♀, 51 – ♂); 52, 53 – *C. tenuicornis* (Say, 1832) (52 – ♀, 53 – ♂); 54, 55 – *C. tucuruiensis* Carvalho, 1989 (54 – ♀, 55 – ♂).



Figs 66–75. Male genitalia of *Cylapus amazonicus* Carvalho, 1989 (66–70) and *Cylapus antennatus* Carvalho & Fontes, 1968 (71–75): 66, 71 – endosoma; 67, 72 – left paramere (dorsal view); 68, 73 – left paramere (right lateral view); 69, 74 – apical process of left paramere; 70, 75 – right paramere (left lateral view). Abbreviations: bpr = basal process; dss = sclerotized portion of ductus seminis inside endosoma; es1–4 = endosomal sclerites 1–4; pb = paramere body; sg = secondary gonopore; sl = sensory lobe. Scale bars: 0.1 mm.

apically. *Thoracic pleura* black; mesepimeron with yellow stripe along entire length; metathoracic scent gland evaporative areas fuscous yellow. *Hemelytron* black to dark brown with yellow areas; basal portion of R+M vein yellow; corium with short, relatively broad, oblique yellow patch medially; inner margin of corium and outer margin of clavus narrowly yellow along entire length; apex of clavus narrowly yellow; apex of embolium and basal margin of cuneus yellow; membrane fuscous. *Legs*. Coxae black; metacoxa yellow at apical half; remaining segments varying from brown dirty yellow to black. *Abdomen* black. **Structure, texture and vestiture** (Figs 40–42, 58, 78, 79). ***Head*** covered with relatively long, erect, sparse setae; antenna covered with short, sparse, erect and semirecumbent setae; segment I thin, weakly broadened toward apex; segment II thinner than segment I, cylindrical. ***Thorax.*** *Pronotum* covered with relatively long, erect setae; calli moderately developed. *Mesoscutum and scutellum* covered with relatively long, erect, moderately dense setae; scutellum weakly convex. ***Male genitalia*** (Figs 80–84). *Aedeagus* (Fig. 80). Endosoma with four sclerites (es1–es4): es1 long, with basal two thirds tapering toward apex, apical one third broadened, extreme apex serrate; es2 short, broad, cylindrical, tapering toward apex at apical one sixth; es3 long, strongly tapering toward apex, sharply pointed; es4 long, weakly arcuate, slightly tapering toward apex, sharply pointed. *Left paramere* (Figs 81–83). Apical process sinuate; paramere body thin, with distinct sensory lobe. *Right paramere* (Fig. 84). Sinuate; apical process short, obtuse; sensory lobe well developed.

Female. Similar to male in structure, texture, and vestiture.

Measurements (in mm). ♂ / ♀. *Body*. Length: 5.90–6.10 / 7.50–8.30, width: 1.75–1.90 / 2.40–2.50. *Head*. Length: 0.62–0.67 / 0.68–0.70, width: 1.25–1.30 / 1.30–1.40, interocular distance 0.47–0.52 / 0.50–0.55. *Antenna*. Length of segment I: 1.40–1.55 / 1.20–1.60, II: 3.45–3.60 / 3.20–5.00, III: 5.45–5.50 / 4.60–5.00, IV: 2.75–3.00 / 3.80–5.00. *Labium*. Length of segment I: 0.98–1.00 / 1.00–1.10, II: 0.95–1.10 / 1.00–1.10, III: 5.40–5.50 / 3.50–4.50, IV: 0.40–0.60 / missing. *Pronotum*. Length: 0.95–1.00 / 1.10–1.15, width of anterior margin: 0.95–1.15 / 1.20–1.30, length of lateral margin: 1.00–1.10 / 1.10–1.30, width of posterior margin: 2.00–2.20 / 2.30–2.40.

Biology. Collected on fallen logs, covered with pyrenomycete fungi (Schuh 1976).

Distribution. Bolivia (La Paz) (this paper), Brazil (Amazonas, Rondônia) (Bergroth 1922, this paper), Guyana (Cuyuni-Mazaruni) (this paper), Peru (Huánuco, Junín, Loreto, Madre de Dios) (Schuh 1976; this paper).

Cylapus luridus sp. nov

(Figs 43, 59, 85–89)

Type material. BRAZIL: Rondônia: Holotype: ♂, "Brazil: Rondônia, 62 km SW Ariquemes, nr Fzda [= Fazenda, farm] Rancho Grande, 4–16–XI–1997 JE Eger; Drake Collection Eger Accesion 1998" (Fig. 43) (USNM). Paratypes: 2 ♂♂, the same data as for holotype (USNM).

Diagnosis. Recognized by the following combinations of characters: antennal segment II in males thicker than segment I (Fig. 43); pronotum black, tinged with red laterally (Fig. 43); outer margin of clavus with narrow, yellowish stripe along entire length (Fig. 43); endosomal sclerites: es1 straight, cylindrical, serrate at apical one fourth; es2 weakly arcuate, cylindrical,

weakly broadened and serrate at apical one sixth; es3 and es4 longest, moderately broadened, sharply pointed; es3 with dextrolateral margin straight and sinistrolateral margin arcuate; es4 with dextrolateral margin arcuate, sinistrolateral margin sinuate (Fig. 85); left paramere when viewed dorsally with sensory lobe strongly developed (Fig. 86).

Most similar to *C. amazonicus*, *C. antennatus*, *C. marginicollis*, and *C. tucuruiensis* in sharing the thick antennal segment in males (Figs 36, 38, 43, 55, 56, 57, 59, 60, 92). It can, however, be distinguished by the shape of the male genitalia (Figs 85–89). With *C. tucuruiensis* in shares outer margin of clavus with yellow stripe along entire length. It can be easily distinguished by having yellow patch on corium (Figs 43, 54, 55) and male genitalia (Figs 85–89, 140–144).

Description. ***Male*****. Coloration** (Figs 43, 59). Dorsum black with red and yellow areas. ***Head.*** Vertex dark brown, tinged with dirty yellow; frons, mandibular and maxillary plates, clypeus, and buccula black; frons indistinctly tinged with yellow basally; gula yellow; antennal segments I and II black; segments III and IV dark brown; segment III with relatively broad, yellow annulation basally; labium black. ***Thorax.*** *Pronotum* black, tinged with red laterally; collar dirty yellow; humeral angle yellow. *Mesoscutum and scutellum* black, narrowly yellow apically. *Thoracic pleura* black; posterior margin of mesepimeron yellow red along entire length; metathoracic scent gland evaporative area yellow tinged with fuscous. *Hemelytron* black; outer margin of clavus and inner margin of corium with yellow, narrow stripe along entire length; apical margin of corium and basal margin of cuneus yellow along entire length. *Legs*. Coxae black; remaining segments dark brown. ***Abdomen*** black. **Structure, texture and vestiture** (Figs 43, 59). Dorsum covered with relatively long, semirecumbent and erect setae. ***Head.*** antennal segment II thicker than segment I, gradually becoming narrower toward apex. ***Thorax.*** *Pronotum* calli moderately developed. *Scutellum* moderately convex. ***Male genitalia*** (Figs 85–89). *Aedeagus* (Fig. 85). Endosoma with four sclerites (es1–es4): es1 straight, cylindrical, serrate at apical one fourth; es2 weakly arcuate, cylindrical, weakly broadened and serrate at apical one sixth; es3 and es4 longest, moderately broadened, sharply pointed; es3 with dextrolateral margin straight and sinistrolateral margin arcuate; es4 with dextrolateral margin arcuate, sinistrolateral margin sinuate. *Left paramere* (Figs 86–88). Apical process weakly arcuate and tapering toward apex; paramere body arcuate in lateral view, with strongly developed sensory lobe. *Right paramere* (Fig. 89). Apical process short, obtuse, both margins of paramere body sinuate.

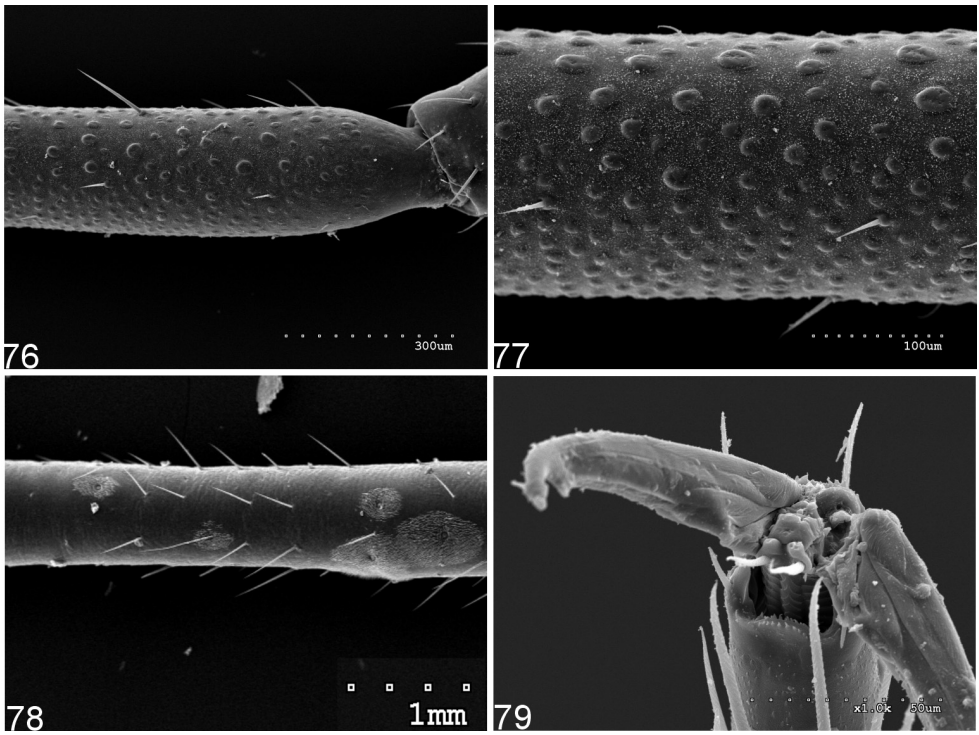
Female. Unknown.

Measurements (in mm). ♂ (*: holotype measurements): *Body*. Length: 6.60*–6.70, width 1.80–2.00*. *Head*. Length: 0.57–0.62*, width: 1.30*, interocular distance: 0.58*. *Antenna*. Length of segment I: 1.10*–1.30, II: 2.38–2.75*, III: 3.00 (in holotype missing), IV: 1.50 (in holotype missing). *Labium.* Length of segment I: 0.88*, II: 0.88–0.90*, III: 1.10*, IV: 0.32*–0.35. *Pronotum*. Length: 1.00–1.10*, width of anterior margin: 1.10–1.20*, length of lateral margin: 1.00–1.10*, width of posterior margin: 1.90*.

Etymology. The species name is the Latin adjective *luridus* (*-a*, *-um*) meaning pale yellow and is used to denote the clavus with thin, yellow stripe along outer margin.

Biology. Unknown.

Distribution. Brazil (Rondônia) (this paper).



Figs 76–79. Scanning electron micrographs of *Cylapus antennatus* Carvalho & Fontes, 1968 (76–77) and *C. citus* Bergroth, 1922 (78–79): 76–77 – antennal segment II; 78 – metafemur; 79 – pretarsal structure.

Cylapus marginicollis (Distant, 1883)

(Figs 44, 45, 60, 91–94, 97–101)

Valdasus marginicollis Distant, 1883: 243 (new species).
Valdasus marginicollis: Atkinson (1890): 49 (catalog); Carvalho & Dolling (1976): 801 (discussion of type).
Cylapus marginicollis Distant (1893): 420 (new combination); Poppius (1909): 43 (list); Bergroth (1920): 71 (list); Schuh (1995): 23 (catalog); Gorczyca (2006b): 16 (catalog); Schuh (2013) (online catalog).
Cylapus (*Cylapus*) *marginicollis*: Carvalho (1957): 30 (catalog).

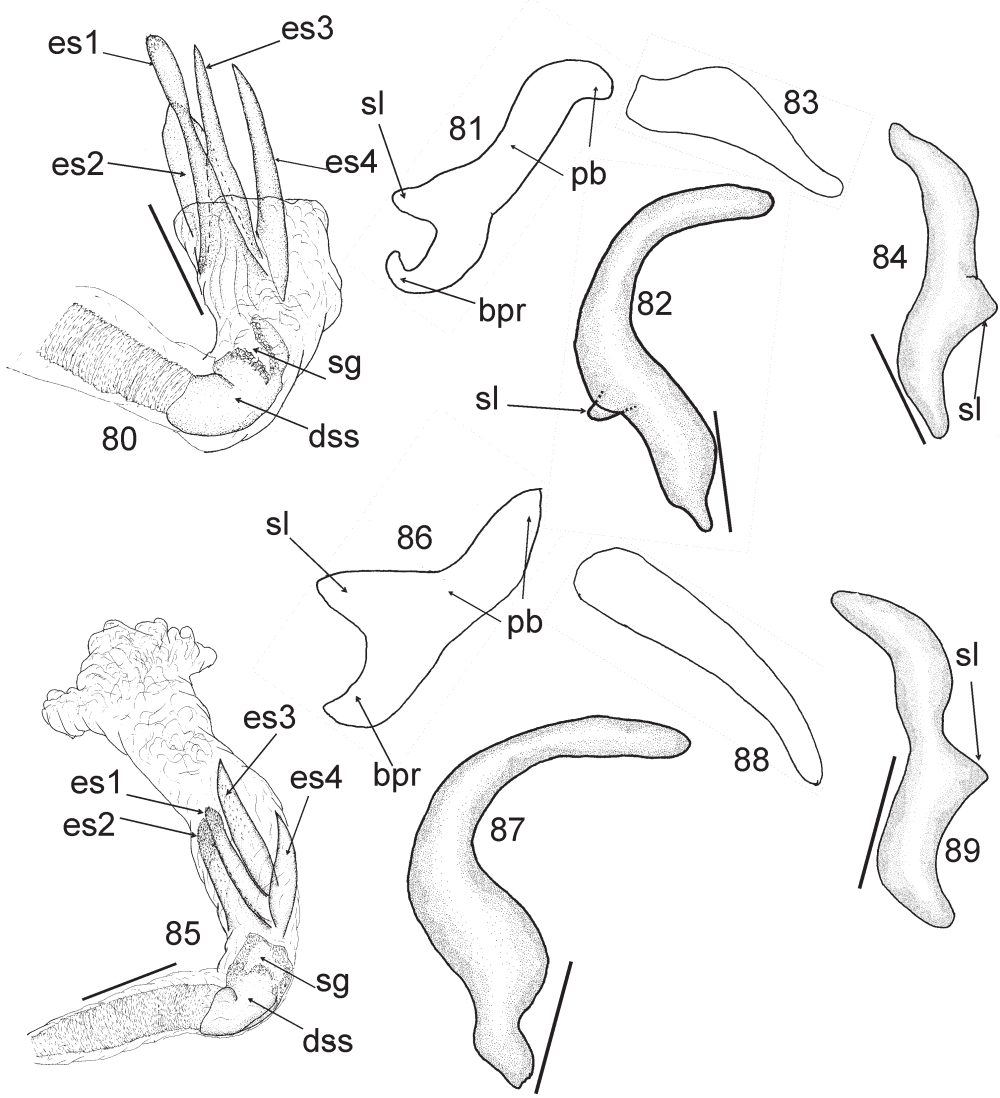
Type material (not examined). Holotype: **PANAMA: Chiriquí:** 1 ♀, "Volcan de Chiriqui 2500 to 4000 feet, Bugaba (Champion)" (BMNH).
Type material examined. Paratypes: **PANAMA: Chiriquí:** 2 ♀♀ on one pin: "V[olcan] de Chiriqui, 25–4000 ft., Champion; B.C.A., Hem. I *Cylapus marginicollis*, Exchange Ex B.M. (N.H.); Carvalho to Drake Coll. 1993; paratype [yellow round label]" (USNM); 1 ♂: "V[olcan] de Chiriqui, 25–4000 ft., Champion; B.C.A., Hem. I *Cylapus marginicollis*, Exchange Ex B.M. (N.H.); Carvalho to Drake Coll. 1993; paratype [yellow round label]" (USNM); 1 ♀: "V[olcan] de Chiriqui, 25–4000 ft., Champion; Cotype U.S.N.M. [red label]" (USNM).
Additional examined specimens. NICARAGUA: Región Autónoma de la Costa Caribe Sur: 1 ♀, "Rama Nicaragua IX–62; Colección Dr. Carpintero, Argentina; Carvalho to Drake Coll. 1993" (USNM) (Fig. 45). **PANAMA: Panamá:** 2 ♂♂ 1 ♀, "Cabima Pan, May 27.11 August Busck" (USNM) (Fig. 44).

Diagnosis. Distinguished by the following set of features: antennal segment II in males thicker than segment I (Figs 60, 92); pronotum with distinct, yellow swelling along lateral margin (Figs 44, 45); corium with yellow patch medially (Figs 44, 45); endosoma with es1 short, cylindrical and without denticles at basal two thirds, apical one third broadened and serrate; es2 long, arcuate, weakly broadened and serrate apically; es3 long, tapering toward apex, its margins weakly sinuate; es4 with basal one sixth thin, nearly cylindrical, rest of the sclerite with dextrolateral margin arcuate and sinistrolateral margin strongly arcuate (Fig. 97); left paramere with sensory lobe moderately developed (Figs 98, 99).

Most similar to *C. amazonicus*, *C. antennatus*, *C. luridus* and *C. tucuruiensis* in sharing the antennal segment II in males thicker than segment I (Figs 36, 38, 43, 55, 56, 57, 59, 60, 92). It can, however, be easily distinguished by the pronotum with yellow swelling along lateral margin (Figs 44, 45) and the shape of the male genitalia (Figs 97–101). With *C. stellatus* it shares yellow stripe along posterior margin of pronotum but it can be distinguished by the lack of yellow longitudinal stripe along medial part of pronotum and structure of the male genitalia.

Redescription. ***Female*****. Coloration** (Fig. 45). Dorsum dark brown with yellow areas. ***Head*** dark brown with dirty yellow and yellow areas; two dirty yellow patches occupying most of vertex, from medial sulcus to inner margin of eye; frons with three yellow, relatively large patches: two situated basolaterally, between inner margin of eye and antennal insertion and one mediobasally between antennal insertions; gula, posterior half of maxillary plates and buccula yellow; antenna black; segment III with yellow annulation basally; labium dark castaneous. ***Thorax.*** *Pronotum* dark brown to black; lateral portion with relatively broad, longitudinal yellow stripe along swelling bordering lateral margin originating from anterior angle and terminating on posterior margin; posterior margin dark red. *Mesoscutum and scutellum* dark brown; scutellum with three, relatively large, yellow patches: two basolaterally and one apically; medial portion sometimes with longitudinal, yellow stripe. *Thoracic pleura*. Proepisternum and proepimeron dark red; proepimeron with yellow, longitudinal stripe medially originating from anterior margin and terminating on posterior margin; remaining pleura dark castaneous; metathoracic scent gland evaporative areas fuscous yellow. *Hemelytron* dark brown; basal half of R+M vein yellow; corium with yellow patch medially connected with yellow stripe of R+M vein; apex of embolium and basal margin of cuneus yellow; membrane dark brown. *Legs* dark brown. ***Abdomen*** varying from dark castaneous to black. **Structure, texture and vestiture** (Figs 45, 91, 93, 94). ***Head*** covered with sparse, relatively long, erect setae; antenna covered with sparse, short, semirecumbent setae; segment I cylindrical; segment II weakly thinner than segment I at basal two thirds, apical one third broadened and flattened. ***Thorax.*** *Pronotum* covered with relatively dense, short, erect setae. Posterior portion with yellow swelling from anterior margin to posterior margin. *Mesoscutum and scutellum* covered with relatively dense, erect setae; scutellum flat.

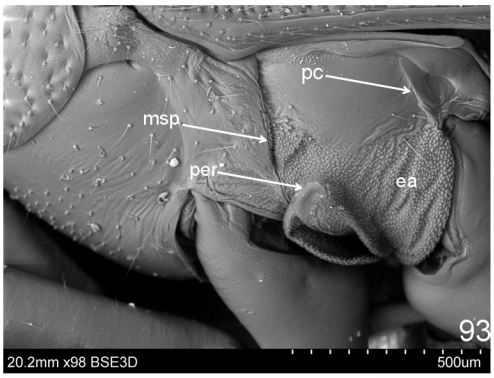
Male. Similar to female in coloration, structure, texture, and vestiture but smaller. Antennal segment II thick, thicker than segment I, cylindrical (Figs 44, 60, 92). ***Male genitalia*** (Figs 97–101). *Aedeagus* (Fig. 97). Endosoma with four sclerites (es1–es4): es1 short, cylindrical and without denticles at basal two thirds, apical one third broadened and serrate; es2 long, arcuate, weakly broadened and serrate apically; es3 long, tapering toward apex, its margins

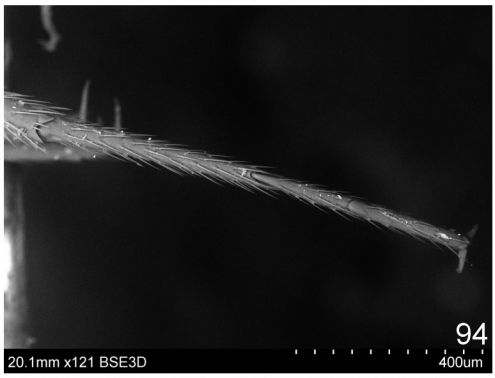


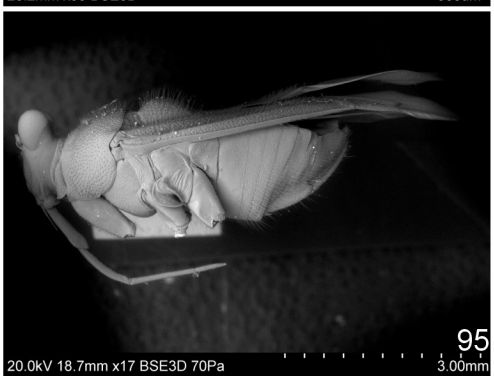
Figs 80–89. Male genitalia of *Cylapus citus* Bergroth, 1922 (80–84) and *C. luridus* sp. nov. (85–89): 80, 85 – endosoma; 81, 86 – left paramere (dorsal view); 82, 87 – left paramere (right lateral view); 83, 88 – apical process of left paramere; 84, 89 – right paramere (left lateral view). Abbreviations: bpr = basal process; dss = sclerotized portion of ductus seminis inside endosoma; es1–4 = endosomal sclerites 1–4; pb = paramere body; sg = secondary gonopore; sl = sensory lobe. Scale bars: 0.1 mm.

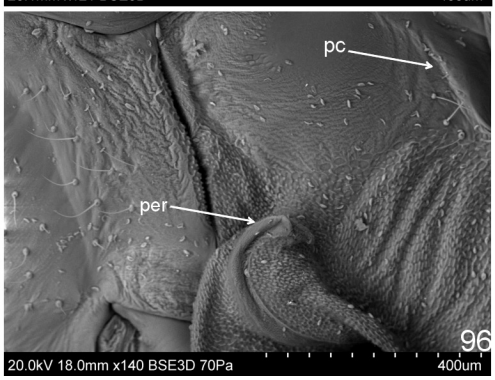

4.00mm
25.3mm x14 BSE3D
91

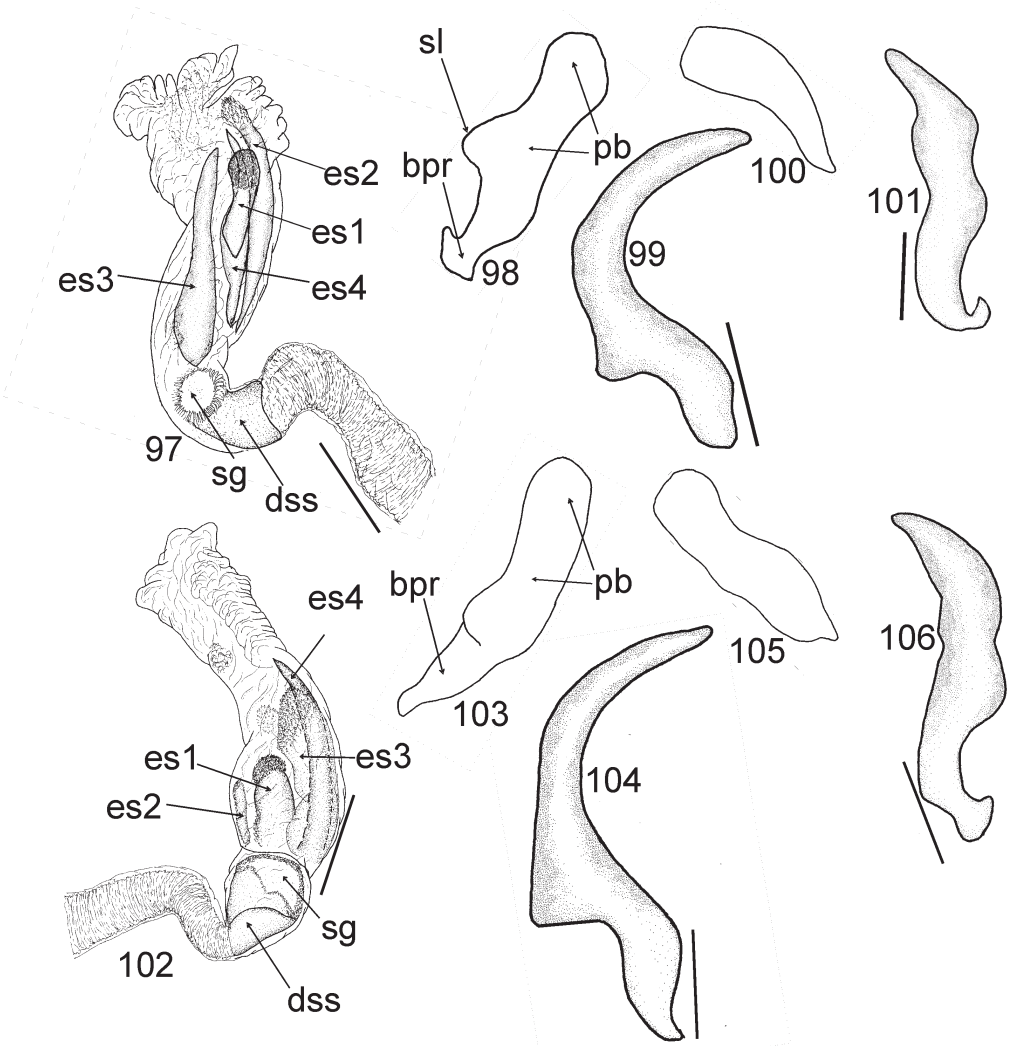

19.9mm x16 BSE3D
3.00mm
92


pc
msp
per
ea
93
20.2mm x98 BSE3D
500um


94
20.1mm x121 BSE3D
400um


95
20.0kV 18.7mm x17 BSE3D 70Pa
3.00mm


pc
per
96
20.0kV 18.0mm x140 BSE3D 70Pa
400um



Figs 97–106. Male genitalia of *Cylapus marginicollis* (Distant, 1883) (97–101) and *C. ruficeps* Bergroth, 1922 (102–106): 97, 102 – endosoma; 98, 103 – left paramere (dorsal view); 99, 104 – left paramere (right lateral view); 100, 105 – apical process of left paramere; 101, 106 – right paramere (left lateral view). Abbreviations: bpr = basal process; dss = sclerotized portion of ductus seminis inside endosoma; es1–4 = endosomal sclerites 1–4; pb = paramere body; sg = secondary gonopore; sl = sensory lobe. Scale bars: 0.1 mm.

Figs 91–96. Scanning electron micrographs of *Cylapus marginicollis* (Distant, 1883) (91–94) and *C. ruficeps* Bergroth, 1922 (95–96): 91 – dorsal habitus (♀); 92 – lateral view (♂); 93 – thoracic pleura; 94 – mesotarsus; 95 – lateral views; 96 – thoracic pleura. Abbreviations: ea = evaporative areas; msp = metathoracic spiracle; pc = posterior carina; per = peritreme.

weakly sinuate; es4 with basal one sixth thin, nearly cylindrical, rest of the sclerite with dextrolateral margin arcuate and sinistrolateral margin strongly arcuate. *Left paramere* (Figs 98–100). Apical process arcuate, broadened at proximal half, tapering toward apex; sensory lobe moderately developed. *Right paramere* (Fig. 101). Apical process short, obtuse; margins of paramere body strongly sinuate; sensory lobe well developed; basal process short.

Measurements (in mm). ♂ / ♀. *Body*. Length: 5.75–6.00 / 6.90–7.50, width 1.80–2.00 / 2.30–2.60. *Head*. Length: 0.52–0.62 / 0.58–0.60, width: 1.25–1.30 / 1.35–1.37, interocular distance 0.52–0.62 / 0.55–0.58. *Antenna*. Length of segment I: 0.78–0.88 / 0.80–0.82, II: 3.60–3.80 / 3.10–3.45, III: 3.85 / 3.50, IV: 4.10 / 3.10. *Labium*. Length of segment I: 0.65 / 0.80, II: 0.90 / 0.98, III: 0.98 / 0.90, IV: 0.32 / 0.32. *Pronotum*. Length: 0.90–1.00 / 1.10–1. 15, width of anterior margin: 1.10–1.20 / 1.30–1.35, length of lateral margin: 0.85–1.00 / 1.12–1.22, width of posterior margin: 1.80–1.90 / 2.25–2.45.

Biology. Collected on fallen trees covered with black fungi (Distant 1883).

Distribution. Nicaragua (Región Autónoma de la Costa Caribe Sur) (this paper), Panama (Chiriquí, Panamá) (Distant 1883; this paper).

Cylapus nobilis Poppius, 1909

Cylapus nobilis Poppius, 1909: 11, 43 (new species).

Cylapus nobilis: Bergroth (1920): 71 (list); Carvalho & Fontes (1968): 274 (list); Schuh (1995): 24 (catalog); Gorczyca (2006b): 16 (catalog); Schuh (2013) (online catalog).

Cylapus (*Cylapus*) *nobilis*: Carvalho (1957): 30 (catalog).

Type material (not examined). VENEZUELA: "Venezuela, 11°, 8' S. Br., 75° 17' W. von Greenw., 1800 in. EL. d. M., 10. IX. 1906, N ICONNIKOFF" (ZMUM).

Remarks. The type specimen of *C. nobilis* was unavailable for my study and this species is not treated in this paper. Based on the description by Poppius (1909) this species seems to be most similar to *C. antennatus*, *C. luridus*, and *C. tucuruiensis* in having black pronotum, broadly tinged with red laterally (Figs 37–39, 43, 54, 55). Within the material deposited in USNM I found two specimens from Brazil each being identified as both *C. antennatus* and *C. nobilis* and both bearing the "compared with type" label attached by J. C. M. Carvalho. However, those specimens do not seem to belong neither to *C. antennatus* nor to *C. nobilis* as they have a yellow stripe along the outer margin of cuneus not found in both species (Figs 37–39; Poppius 1909). The finding of these specimens identified as *C. antennatus* and *C. nobilis* bearing a "compared with type label" would suggest affinity of *C. nobilis* with group of similar *Cylapus* species with red patches on lateral portion of pronotum (*C. antennatus*, *C. luridus*, and *C. tucuruiensis*).

Cylapus ruficeps Bergroth, 1922

(Figs 46, 47, 61, 95, 96, 102–106)

Cylapus ruficeps Bergroth, 1922: 2 (new species).

Cylapus ruficeps: Carvalho & Fontes (1968): 275 (list); Schuh (1976): 9, 20, Fig. 38 (discussion); Schuh (1995): 24 (catalog); Kerzhner & Konstantinov (1999): 121, 122, Fig. 9 (male genitalia); Gorczyca (2006b): 16 (catalog); Schuh (2013) (online catalog).

Cylapus (*Cylapus*) *ruficeps*: Carvalho (1957): 30 (catalog).

Type material (not examined). PERU: Cuzco: Holotype: ♂, "Peru (Callanga)" (Fig. 46) (NHRS).
Material examined. BRAZIL: Amazonas: ♂, "Brazil: Amazonas: Reserva Ducke, 25 kmNNE Manaus, 120 m., July 26, 1973, R. T. Schuh" (AMNH); 2 ♀♀, "Brazil: Amazonas: Reserva Ducke, 25 kmNNE Manaus, 120 m., July 26, 1973, R. T. Schuh" (AMNH); ♀, "Brazil: Amazonas: Reserva Ducke, 25 km NNE Manaus, 120 m., July 26, 1973, R. T. Schuh" (AMNH). **Pará:** ♀, "Santarem, 10.VIII.19, Brazil, HS Parish Collr; H. H. Knight Collection 1976" (USNM). **COLOMBIA: Vaupés:** 1 ♀, "Mitu-Vaupes, Colombia, 6/17–July–90, leg. L. E. Peña" (USNM). **ECUADOR: Orellana:** 1 ♀, "Ecuador: Napo, Res. Ethnica Waorani, 16 km S. Onkone Gare Camp, Trans Ent., 4 Oct. 1994, 220 m, 00º39′10″S; 76º26′00″W, T. L. Erwin, et al.; Insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest. At Trans. 1, Sta. 8 Project Maxus, Lot 857" (USNM); 1 ♀, "Ecuador: Napo: Res. Ethnica Waorani, 16 km S. Onkone Gare Camp, Trans Ent., 4 Oct. 1984, 220 m, 00º39′10″S; 76º26′00″W, T. L. Erwin, et al.; Insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest, Lot 728" (USNM); 1 ♀, "Ecuador: Napo: Tiputini Biodiversity Station, 216 m, 00º37′55″S; 76º08′39″W, 21 Oct. 1998, T. L. Erwin, et al. collectors; Insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest, Lot 1986, Trans. T–9" (USNM). **VENEZUELA: Amazonas:** ♀, "Venezuela, T. F. Amaz., Cerro de la Neblina Basecamp, 140 m, 0º50′N, 66º10′W, 27 February 1985; P.J. & P.M. Spangler, R.A. Faitoute, W.E. Steiner collectors" (USNM); 3 ♂♂ 1 ♀, "Venezuela, T. F. Amaz., Cerro de la Neblina Basecamp, 140 m, 0º50′N, 66º10′W, 20 February 1985; On bark of cut timber with bracket fungi; rainforest, W. E. Steiner collector" (USNM) (Fig. 47, ♀).

Diagnosis. Recognized by the following combination of characters: antennal segment II in both sexes thinner than segment I (Figs 46, 47); head entirely brown to dark red (Figs 46, 47, 61); corium with two yellow patches medially (Figs 46, 47); endosoma with es1 short and stout, basal three fourths with weakly arcuate margins, without denticles; apical one fourth round, serrate; es2 short and thin, with weakly sinuate margins, its sinistrolateral margin serrate; es3 ovoid in basal one third, narrowed medially and strongly broadened and serrate apically; es4 long, arcuate, sharply pointed (Fig. 102); left paramere with sensory lobe weakly developed (Fig. 104).

Most similar to *C. citus* in sharing the black corium with yellow, transverse patch medially (Figs 40–42, 46, 47). It can, however, be easily distinguished by the head coloration and the shape of the male genitalia.

Redescription. ***Male*** (composite description based on Bergroth 1922 and the specimens mentioned below). **Coloration** (Figs 46, 47, 61). Dorsum fuscous black with red and yellow areas. ***Head*** brown to dark red; medial portion of frons and clypeus usually fuscous; antennal segment I black; segment II varying from dirty yellow with relatively broad, blackish annulation apically to entirely black; segment III black with yellow annulation basally to entirely black; segment IV black; labium dark brown to black. ***Thorax.*** *Pronotum* varying from dark brown to black; collar contrastingly yellow; calli sometimes dark reddish; humeral angle narrowly yellow. *Mesoscutum and scutellum* dark castaneous to black; scutellum narrowly yellow apically. *Thoracic pleura* proepisternum and anterior one third of proepimeron castaneous, weakly tinged with yellow; posterior two thirds of proepimeron and remaining pleura dark brown to black; metepisternum sometimes broadly tinged with yellow; metathoracic scent gland evaporative areas yellow. *Hemelytron* varying from fuscous to black with yellow areas; exocorium with oblique, yellow stripes medially, endocorium with short, longitudinal, yellow stripe medially, sometimes both stripes fused forming broad, oblique stripe medially; apical half of clavus with distinct, longitudinal, yellow stripe medially; apical margin of corium and basal margin of cuneus contrastingly yellow. *Legs* dark brown to black; tibia with

broad, yellow annulation subapically. **Structure, texture and vestiture** (Figs 46, 47, 61). ***Head*** covered with relatively long, erect setae; antennal segment I covered with thin, erect and semirecumbent setae, weakly broadened toward apex; segment II cylindrical, thinner than segment I. ***Thorax.*** *Pronotum* covered with relatively long, erect setae; calli weakly developed. *Scutellum* convex, covered with relatively long, erect setae. *Hemelytron* covered with short, semirecumbent setae. ***Male genitalia*** (Figs 102–106). *Aedeagus* (Fig. 102). Endosoma with four sclerites (es1–es4): es1 short and stout, basal three fourths with weakly arcuate margins, without denticles; apical one fourth round, serrate; es2 short and thin, with weakly sinuate margins, its sinistrolateral margin serrate; es3 ovoid at basal one third, narrowed medially and strongly broadened and serrate apically; es4 long, arcuate, sharply pointed. *Left paramere* (Figs 103–105). Apical process in dorsal view with dorsal margin concave at proximal half and convex at distal half, ventral margin weakly convex medially, extreme apex thin and tapering; paramere body with outer margin straight and inner margin arcuate; sensory lobe weakly developed. *Right paramere* (Fig. 106). Apical process short, obtuse; paramere body with apical half crescentlike and basal half sinuate sinistrolaterally and arcuate dextrolaterally.

Female. Similar to male in coloration, structure, texture, and vestiture.

Measurements (in mm). ♂ / ♀. *Body*. Length: 6.00–6.10 / 5.70–6.70, width: 2.00–2.10 / 2.40–2.80. *Head*. Length: 0.50–0.60 / 0.50–0.60, width: 1.20–1.30 / 1.20–1.30, interocular distance: 0.45–0.60 / 0.50–0.60. *Antenna*. Length of segment I: 1.40–1.50 / 1.40–1.60, II: 2.80–3.00 / 2.50–2.60, III: 4.40 / 3.50–3.80, IV: 3.45–4.50 / 4.00–5.00. *Labium.* Length of segment I: 0.90 / 0.95–1.10, II: 0.90–1.10 / 0.90–1.00, III: 0.90–1.10 / 0.95–1.20, IV: 0.50–0.60 / 0.40–0.50. *Pronotum*. Length: 0.50–0.60 / 0.95–1.10, width of anterior margin: 1.10–1.40 / 1.00–1.30, length of lateral margin: 1.00–1.10 / 1.00–1.15, width of posterior margin: 2.10–2.20 / 1.95–2.10.

Biology. It was observed feeding on fungi (Pyrenomycetes) in Brazil (Schuh 1976). Specimens examined in this paper were collected using insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terre firme forest, or on bark of cut timber with bracket fungi in a rainforest.

Distribution. Brazil (Amazonas, Pará) (Schuh 1976, this paper), Colombia (Vaupés) (this paper), Ecuador (Orellana) (this paper), Peru (Cuzco), Venezuela (Amazonas) (this paper).

Cylapus stellatus (Distant, 1883)

(Figs 48, 49, 62, 110–114)

Valdasus stellatus Distant, 1883: 243 (new species).
Valdasus stellatus: Atkinson (1890): 49 (list).
Cylapus stellatus Poppius (1909): 43 (list, new combination); Bergroth (1920): 71 (list); Carvalho & Fontes (1968): 275 (list); Schuh (1995): 24 (catalog); Gorczyca (2006b): 16 (catalog); Schuh (2013) (online catalog).
Cylapus (*Cylapus*) *stellatus*: Carvalho (1957): 31 (catalog).

Type material examined. GUATEMALA: Vera Cruz: Lectotype (designated by Carvalho & Dolling 1976): ♀, "Cubilguitz, Vera Paz, Champion; B.C.A., Hem. I Cylapus stellatus; BMNH(E) 1705767; Lectotype [round label with violet border]" (BMNH). Paralectotype: ♂, "San Juan, Vera Paz, Champion; Distant Coll. 1911–383.; Paralectotype [round label with blue border]" (BMNH).

Diagnosis. Recognized by the following set of features: antennal segment II in both sexes thinner than segment I (Fig. 49); pronotum with two thin yellow stripes, each bordering lateral

margin and a thin, yellow, longitudinal stripe medially (Figs 48, 49); scutellum with three yellow patches: two situated basolaterally and one situated apically (Figs 48, 49); corium with four yellow patches: one basally, two medially and one apically (Figs 48, 49); sclerite es1 with both margins strongly sinuate, apical one fifth broadened and serrate; es2 broadened toward apex with apical one fourth round and serrate; es3 with basal two thirds gradually becoming thicker toward apex, its apical one third strongly broadened, nearly triangular; es4 thin, nearly cylindrical, weakly tapering apically (Fig. 110); left paramere with sensory lobe weakly developed (Figs 111, 112).

Most similar to *C. marginicollis* in sharing the yellow swelling along lateral margin of pronotum (Figs 45, 48, 49). It can, however, be distinguished by the antennal segment II thinner than segment I (Fig. 49) and the male genitalia (Figs 110–114). With *C. striatus* and *C. tenuicornis* it shares three patches on scutellum and four patches on corium (Figs 48–53) but can be easily distinguished by the male genitalia.

Redescription. *Female*. Coloration (Figs 48, 49, 62). Dorsum dark brown with yellow areas. ***Head*** dark brown with broad, yellow areas posterolaterally and medially; frons, maxillary and mandibular plates, clypeus, and buccula dark brown, weakly tinged with yellow; gula mostly yellow; antennal segment I blackish; segment II narrowly blackish basally, rest of basal half dirty yellowish, apical half (except for yellow extreme apex) dark brown; segments III and IV brown; labium dark brown. ***Thorax.*** *Pronotum* dark brown with three yellow stripes: two, occupying basal three fourths, situated along posterior margins and one, originating from posterior margin of pronotal calli and reaching posterior margin, situated medially. *Mesoscutum and scutellum* dark brown; scutellum with three yellow patches: two situated posterolaterally and one apically. *Thoracic pleura.* Proepisternum and anterior one third of proepimeron dark brown, posterior two thirds dark red; remaining pleura blackish; metathoracic scent gland evaporative area fuscous, broadly dark with yellow. *Hemelytron* dark brown; corium with four yellow patches: one situated on R+M vein basally, two situated medially, and one apicolaterally; clavus with two small yellow patches: basally and apically; cuneus dark brown, apical angle dark yellow, inner angle yellow; membrane fuscous. *Legs*. Coxae, pro- and mesofemora (hind leg lacking) blackish; mesofemur with yellow patch medially; protibia blackish with yellow annulation medially; mesotibia dark yellow at basal half with yellow annulation medially and blackish apical half; pro- and mesofemora brown. ***Abdomen*** blackish, weakly tinged basally.

Male. Similar to female in coloration, structure, texture, and vestiture. ***Male genitalia*** (Figs 110–114). *Aedeagus* (Fig. 110). Endosoma with four endosomal sclerites (es1–es4): es1 with both margins strongly sinuate, apical one fifth broadened and serrate; es2 broadened toward apex with apical one fourth round and serrate; es3 with basal two thirds gradually becoming thicker toward apex, its apical one third strongly broadened, nearly triangular; es4 thin, nearly cylindrical, weakly tapering apically. *Left paramere* (Figs 111–113). Apical process in dorsal view with proximal two thirds with dorsal margin broadly concave medially, ventral margin straight, apex tapering; paramere body in dorsal view weakly arcuate, in lateral view strongly arcuate; sensory lobe weakly developed. *Right paramere* (Fig. 114). Apical process moderately developed, sharply pointed; paramere body relatively thin, outer margin nearly straight, inner margin weakly sinuate, sensory lobe weakly developed.

Measurements (in mm). ♂ / ♀. *Body*. Length: 5.90 / 6.50, width 2.10 / 2.60. *Head*. Length: 0.52 / 0.55, width: 1.20 / 1.25, interocular distance: 0.52 / 0.45. *Antenna*. Length of segment I: 1.40 / 1.00, II: 2.75 / 2.50, III 3.70 / missing, IV 3.15 / missing. *Labium*. Length of segment I: 0.67 / 0.65, II–IV (obscured by glue and immeasurable in both specimens). *Pronotum*. Length: 1.00 / 1.10, width of anterior margin: 1.15 / 1.30, length of lateral margin: 0.90 / 1.10, width of posterior margin: 2.00 / 2.35.

Biology. Collected on fallen trees covered with black fungi (Distant 1883).

Distribution. Guatemala (Vera Paz) (Distant 1883).

Cylapus striatus Reuter, 1907

(Figs 50, 51, 63, 107–109, 115–119)

Cylapus striatus Reuter, 1907: 77 (new species)

Cylapus striatus: Poppius (1909): 43 (list); Bergroth (1920): 71 (list); Carvalho & Fontes (1968): 275 (list); Carvalho & Alfonso (1977): 7 (list); Carvalho (1980): 650 (diagnosis, type specimen); Schuh (1995): 24 (catalog); Gorczyca (2006b): 16, Fig. 4 (catalog); Schuch (2013) (online catalog)

Cylapus (*Cylapus*) *striatus*: Carvalho (1957): 31 (catalog).

Type material (not examind). BRAZIL: ♀, "Brasilia, Schott" (NHMW).

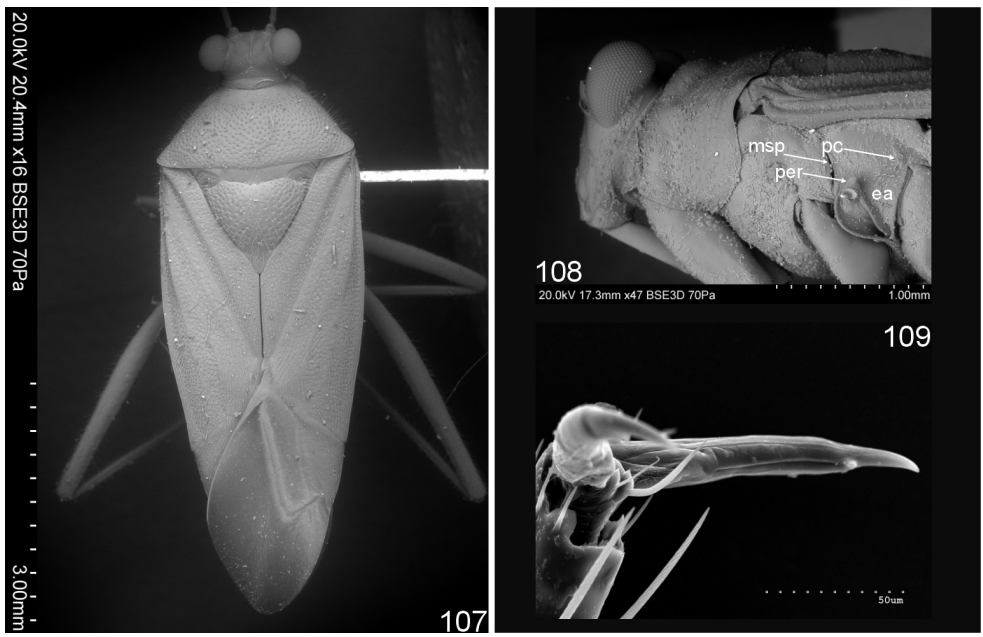
Material examined. BOLIVIA: Cochabamba: 1 ♂ 1 ♀ (two specimens on one pin): "BOLIVIA, D[epartament] o Cochab[amba] Pcia. Chapare-Yungas del Palmar 700 m III–53 Martinez – col.; 1 ♂ 1 ♀, Sajta, XI–93 Chapare, Bolivia" (USNM) (Fig. 51). **BRAZIL: Amazonas:** 1 ♀, "Unt[erer]-Amaz[onas], Taperinha b. Santarem, 1–7. IX. 27. Zerny (coll?)" (NHMW). **Mato Grosso:** 1 ♂, "Serra da Caveira, 600 m, M. Itaguay, Est. do Rio 25–2–1948 W. Zikán" (USNM); 1 ♀, BRAZIL, "Mato Grosso: Sinop, October 1976, M. Alvarenga" (USNM). **Minas Gerais:** 1 ♂ 3 ♀♀, "*Nova União* Ouro Preto RO Brasil XII 83 Col. Bento; Carvalho to Drake Coll. 1993" (USNM). **Santa Catarina:** 1 ♀, "Aquatneta, Balia, P. Silvae; S[an]t[a] Catarina; Dohrn" (NHRS); 1 ♀, "S. Catarina, Lüderwaldt" (ZMPA); 1 ♀, "Nova Teutonia S[an]ta Catarina Brasil, VII.31.1944 F. Plaumann J C Lutz Collection 1961" (USNM). **PERU: Huánuco:** 1 ♀, "PERU: Monson Valley Tingo Maria X–21–1954; E. I. Schlinger & E.S. Ross collectors; Carvalho to Drake coll. 1993" (USNM). **VENEZUELA: Amazonas:** 2 ♀♀, "VENEZUELA, T. F. Amaz[onas] Cerro de Neblina Basecamp, 140 m. 0°50′N, 66°10′W, 5 February 1985; Pyrethrin fogging of vine tangle; canopy of flood plain forest along Rio Baria; R. Cocroft & W. Steiner" (USNM) (Fig. 50); 1 ♀, "On *Ficus glabrata* Jungle 630 m a.s.l. Shapajilla Huanaco Peru Apr[il] 8 '39, F. Woytkovski" (NHMW); 1 ♀, "VENEZUELA: Amazonas Rio Mavaca Camp, 65º6′W, 2º2′N 150 m, 16–27/III/89" (AMNH).

Diagnosis. Recognized by the following set of characters: antennal segment II in both sexes thinner than segment I (Figs 50, 51); pronotum with yellow, longitudinal stripe medially and with two yellow patches, each situated laterally, bordering callus (Figs 50, 51); scutellum with three patches: two basolaterally and one apically (Figs 50, 51); R+M vein yellow, narrowly black medially (Figs 50, 51); corium with broad patch medially (Figs 50, 51); endosomal sclerite arcuate (Fig. 115); left paramere with sensory lobe moderately developed (Figs 116, 117).

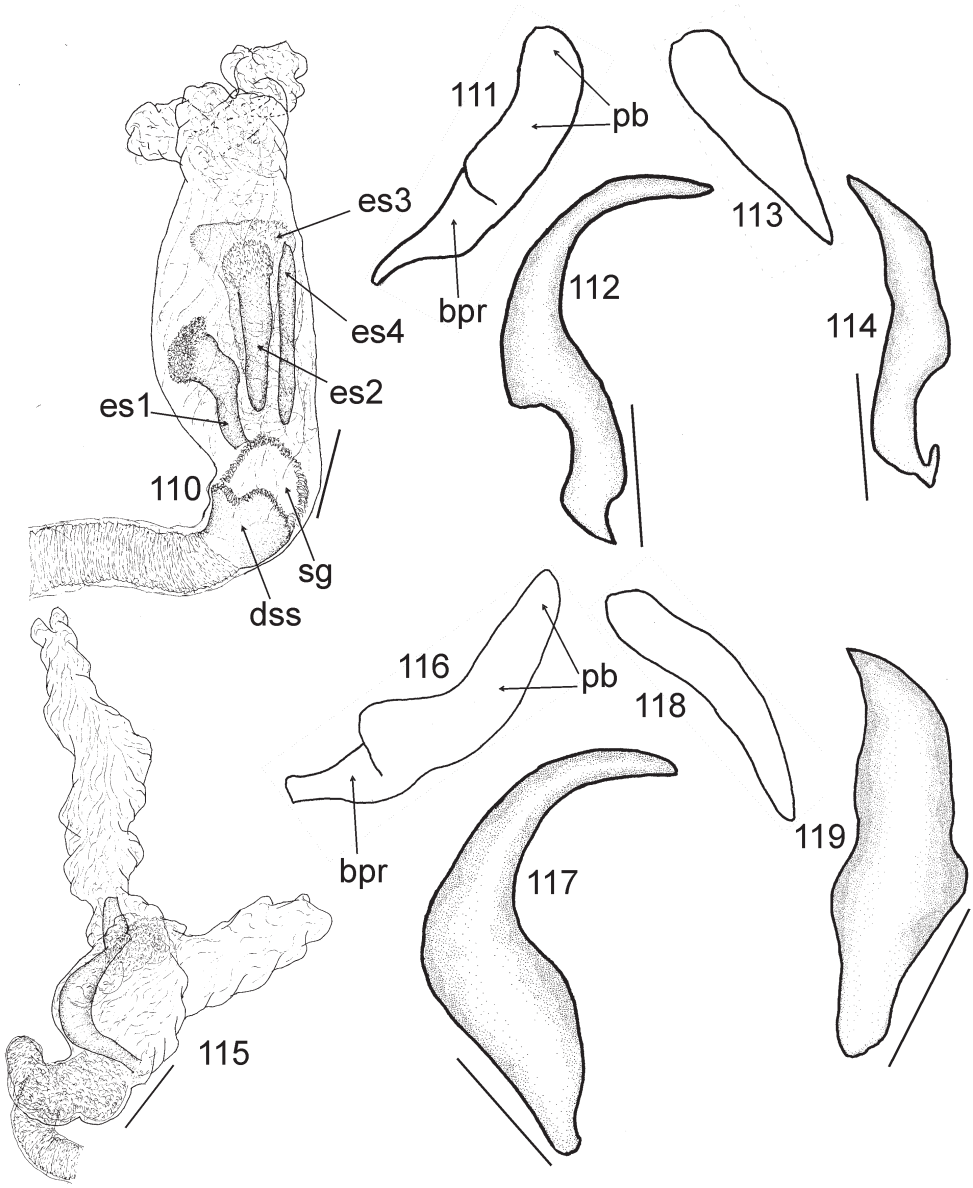
Most similar to *C. stellatus* and *C. tenuicornis* in sharing scutellum with three patches (Figs 48–53). It can, however, be easily distinguished by the coloration of the hemelytron and the shape of the male genitalia.

Redescription. ***Male.*** **Coloration** (Figs 50, 51, 63). Dorsum dark brown black with large yellow and dirty yellow areas. ***Head.*** Vertex dirty yellow, broadly tinged with brown to dark brown; frons, clypeus, and mandibular plate dark brown to black; frons tinged with yellow basally; maxillary plate, buccula, and gula yellow; antenna dark brown; segment II contrastingly yellow apically; labium dark brown. ***Thorax.*** *Pronotum* dark brown with large, yellow

areas; collar yellow; calli dirty yellow, tinged with brown or fuscous; anterolateral portion with more or less developed yellow patch, sometimes reaching posterior margin; medial portion with yellow, longitudinal stripe from posterior margin of pronotal calli till posterior margin; posterior margin tinged with yellow along entire length. *Mesoscutum and scutellum* brown to dark brown; scutellum with three large, yellow or reddish yellow patches: two basolaterally and one apically. *Thoracic pleura.* Proepimeron and proepisternum varying from entirely dark brown to dark brown, broadly tinged with yellow; remaining pleura dark castaneous; evaporative areas and peritreme contrastingly yellow. *Hemelytron.* Corium dark brown black with basal half slightly paler than apical half; medial fracture yellow medially; R+M vein yellow, interrupted medially; medial portion of corium with relatively broad, yellow patch; apical outer angle of corium yellow; inner margin of corium yellow; clavus dark brown, claval vein yellow along entire length; clavus dark brown, its inner angle broadly yellow; membrane fuscous. *Legs.* Coxae dark castaneous; pro- and mesocoxae yellow at apical one fourth; metacoxa yellow at apical half; remaining segments of all legs dark brown with dirty yellow and yellow areas. ***Abdomen*** black, tinged with yellow laterodorsally and subapically.
Structure, texture and vestiture (Figs 50, 51, 63, 107–109). Body elongate; dorsum covered with short, fine, semirecumbent setae. ***Head.*** Antennal segment II thinner than segment I.



Figs 107–109. Scanning electron micrographs of *Cylapus striatus* Reuter, 1907. 107 – dorsal habitus (♀); 108 – lateral view (♀); 109 – pretarsal structure. Abbreviations: ea = evaporative areas; msp = metathoracic spiracle; pc = posterior carina; per = peritreme.



Figs 110–119. Male genitalia of *Cylapus stellatus* (Distant, 1883) (110–114) and *C. striatus* Reuter, 1907 (115–119): 110, 115 – endosoma; 111, 116 – left paramere (dorsal view); 112, 117 – left paramere (right lateral view); 113, 118 – apical process of left paramere; 114, 119 – right paramere (left lateral view). Abbreviations: bpr = basal process; dss = sclerotized portion of ductus seminis inside endosoma; es1–4 = endosomal sclerites 1–4; pb = paramere body; sg = secondary gonopore; sl = sensory lobe. Scale bars: 0.1 mm.

Scutellum moderately convex. ***Male genitalia*** (Figs 115–119). *Aedeagus* (Fig. 115). Endosoma strongly membranous, with one, strongly arcuate sclerite. *Left paramere* (Figs 116–118). Apical process thin, arcuate; paramere body well arcuate in dorsal and lateral views; sensory lobe moderately developed in dorsal view. *Right paramere* (Fig. 119). Apical process short, sharply pointed; paramere body with apical two thirds with dextrolateral margin weakly arcuate and sinistrolateral margin weakly sinuate; basal one third with both margins arcuate; sensory lobe moderately developed; basal process weakly tapering.

Female. Similar to male in coloration, structure, texture, and vestiture.

Measurements (in mm). ♂ / ♀. *Body*. Length: 5.70–6.50 / 6.40–7.70, width: 1.60–1.90 / 1.80–2.10. *Head*. Length: 0.50–0.60 / 0.58–0.60, width: 1.10–1.30 / 1.20–1.30, interocular distance: 0.40–0.50 / 0.50. *Antenna*. Length of segment I: 1.10–1.30 / 0.90–1.15, II: 3.10–3.90 / 2.70–3.20, III: 4.20–5.20 / 3.00–5.00, IV: 3.00–5.50 / 3.00–4.00. *Labium*. Length of segment I: 0.80–1.20 / 0.80–1.00, II: 0.90–1.50 / 0.80–1.20, III: 0.95–1.10 / 0.90–1.15, IV: 0.30–0.40 / 0.35–0.50. *Pronotum*. Length: 0.80–0.90 / 0.70–0.90, width of anterior margin: 1.10–1.20 / 1.10–1.30, length of lateral margin: 0.80–0.90 / 0.85–1.10, width of posterior margin: 1.70–2.10 / 1.75–2.15.

Biology. Collected using pyrethrin fogging of vine tangle in canopy of a floodplain forest, found also on *Ficus glabrata*.

Distribution. Bolivia (Cochabamba) (this paper), Brazil (Mato Grosso, Minas Gerais, Pará, Santa Catarina) (Reuter 1907; this paper), Peru (Huánuco) (Carvalho & Alfonso 1977; this paper), Venezuela (Amazonas) (this paper).

Cylapus tenuicornis (Say, 1832)

(Figs 52, 53, 64, 120–139)

Capsus (*Cylapus*) *tenuicornis* Say, 1832: 26 (new species).

Cylapus tenuicornis: Uhler (1886): 20 (list); Poppius (1909): 10, 43 (list); Van Duzee (1916): 42 (list), Van Duzee (1917): 364 (list); Knight (1918): 42, pl 3, Fig. 40 (key), Bergroth (1920): 71 (list); Blatchley (1926): 877 (list); Knight (1941): 4, 19, 21, 61, Figs 21, 31 (diagnosis); Carvalho (1955): pl. l: Fig. 2, pl. 5: Fig. 49 (key to genera); Carvalho (1957): 31 (catalog); Carvalho & Fontes (1968): 275 (list); Kelton (1959): 50, Fig. 138 (male genitalia); Akingbohungbe et al. (1973): 12 (description of fifth instar); Wheeler (1980): 484, Fig. 8 (rectal organ); Wheeler et al. (1983): 143 (list); Henry & Wheeler (1988): 271, Fig. 83 (catalog); Wheeler & Wheeler (1994): 115 (associations with pyrenomycete fungi); Schuh (1995): 24 (catalog); Gorczyca (2000): 26, Figs 8–9 (head); Gorczyca (2006b): 17 (catalog); Schuh (2013) (online catalog).

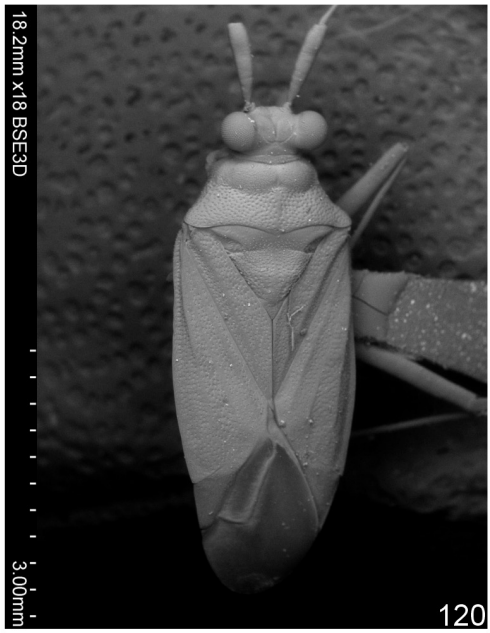
Type designation. Neotype: ♂ (here designated), **USA: Maryland:** "Maryland: Cecil Co. Pleasant Hill 14–16 July 1989 W. E. Steiner & J. M. Swearingen; NEOTYPE: ♂ *Cylapus tenuicornis* (Say 1832) desig. by A. Wolski" (USNM).
Other specimens examined. USA: Maryland: 2 ♂♂ 3 ♀♀, "Maryland: Cecil Co. Pleasant Hill 14–16 July 1989 W. E. Steiner & J. M. Swearingen" (USNM); 2 ♂♂ 3 ♀♀, "Blad[en]sb[ur]g, M[arylan]d; O. Heidemann" (USNM); 4 ♂♂ 4 ♀♀, "Plummer Is[land] M[arylan]d" (USNM); 1 ♂, "Plummer Is, Md, July 20, 1926, H.H. Knight (Fig. 53)" (ZSMC); 1 ♀, "USA: VA: Loudoun Co. Near junction of Goose Creek and Sycolin Rd., Malaise trap, ANIMAL, July 10–23 1999, Cathy J. Anderson" (ZSMC); 1 ♂, "Six Mile Ithaca 24.2.1940, N. Y., P.P. Babiy leg" (ZSMC); 1 ♀, "Six Mile Ithaca 23.8.1939, N. Y., P.P. Babiy leg; ♀, Six Mile Ithaca 30.07.1939, N. Y., P.P. Babiy leg." (Fig. 52) (ZSMC); 1 ♀, "Plummers Isl, Md 168 9, Schwartz & Barber Coll; 1 ♂, Plummers I, II. 7, 09 Md, W.L. McAtee, Collector, Collection WL McAtee" (MRAC). **Virginia:** 1 ♂, "Scott's Run, July 25, 15 V?; WL McAtee Collector; Collection WL McAtee 1942" (USNM). **West Virginia**: 1 ♀, "USA, WV, Jackson Co. Evans, 1–IX–1992, S.F. Hutchinson Lindgren funnel trap, lumber yard; Barcode of Life, DNA voucher specimen Sample CCDB–21309–A03; BOLD Proc. ID: SIHET 383–13" (USNM).

Diagnosis. Recognized by the following set of features: antennal segment II in both sexes thinner than segment I (Figs 52, 53); pronotum with yellow, longitudinal stripe medially (Figs 52, 53); scutellum with three patches: two basolaterally and one apically (Figs 52, 53); corium with four yellow patches (Figs 52, 53); sclerite es1 short with basal two thirds nearly cylindrical, apical one third round, strongly serrate; es2 short, with basal two thirds strongly broadened toward apex, apical one third globose, strongly serrate; es3 nearly triangular, serrate; es4 weakly arcuate, sharply pointed apically and basally (Fig. 135); sensory lobe of left paramere weakly developed (Figs 136, 137).

Most similar to *C. stellatus* and *C. striatus* in sharing pronotum with yellow stripe medially and scutellum with three patches (Figs 48–53). It can, however, be distinguished by the coloration of corium and the male genitalia.

Redescription. ***Male***. **Coloration** (Figs 52, 53, 64). Dorsum dark brown with yellow and blackish areas. ***Head.*** Vertex brown, broadly tinged with yellow apically; frons brown, broadly tinged with yellow laterally and medially; maxillary and mandibular plates, buccula and gula brown yellow; clypeus brown with longitudinal, yellow stripe along entire length; antennal segment I dark castaneous, narrowly yellow basally; segment II varying from dirty yellowish to brown, narrowly dark brown basally, with dark brown or dark castaneous annulation near apex and white annulation apically; antennal segments III and IV varying from brown to dark brown; labium dark brown with dark castaneous and dirty yellow areas. ***Thorax.*** *Pronotum* varying from dark brown to blackish; collar contrastingly yellow; calli entirely dark brown to blackish; anterolateral portion with relatively large dirty yellow or yellow patch; medial portion with yellow, longitudinal stripe originating from posterior margin of calli and terminating at posterior margin of disc. *Mesoscutum and scutellum* dark brown to blackish; scutellum with three yellow patches: two basolaterally and one apically. *Thoracic pleura* proepisternum and proepimeron dark brown, sometimes broadly tinged with yellow; remaining pleura dark castaneous, mesepimeron sometimes tinged with yellow; metathoracic scent gland evaporative area and peritreme contrastingly yellow. *Hemelytron* dark brown with yellow areas; corium with four yellow patches: one situated on R+M vein basally, two situated medially and one situated apicolaterally; clavus with narrow patch basally and apically and with broad yellow patch on inner angle; membrane fuscous tinged with yellow. *Legs*. Coxae dark castaneous; meso- and metacoxae yellow apically; femora dirty yellowish brown with two yellow, more or less developed annulations on apical half; tibiae yellowish brown with yellow annulation medially; tarsi yellowish. **Structure, texture and vestiture** (Figs 52, 53, 64, 120–134). ***Head.*** Antennal segment II thin, thinner than segment I. ***Thorax***. *Pronotum* calli prominent. *Scutellum* flat. ***Male genitalia*** (Figs 135–139). *Aedeagus* (Fig. 135). Endosoma with three endosomal sclerites (es1–es4): es1 short with basal two thirds nearly cylindrical, apical one third round, strongly serrate; es2 short, with basal two thirds strongly broadened toward apex, apical one third globose, strongly serrate; es3 nearly triangular, serrate; es4 weakly arcuate, sharply pointed apically and basally. *Left paramere* (Figs 136–138). Apical process when

Figs 120–126. Scanning electron micrographs of *Cylapus tenuicornis* (Say, 1832): 120 – dorsal habitus; 121 – antennal segment I and II; 122 – apical part of antennal segment III and basal part of segment IV; 123 – lateral view; 124 – structure of eye; 125 – labium; 126 – labial segment II.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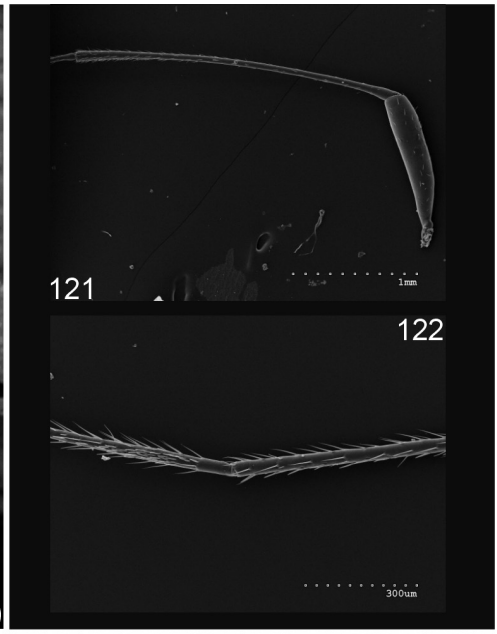
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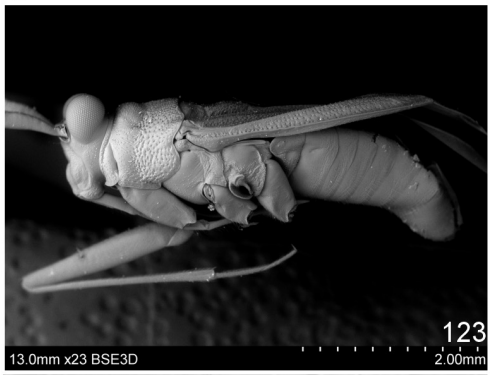
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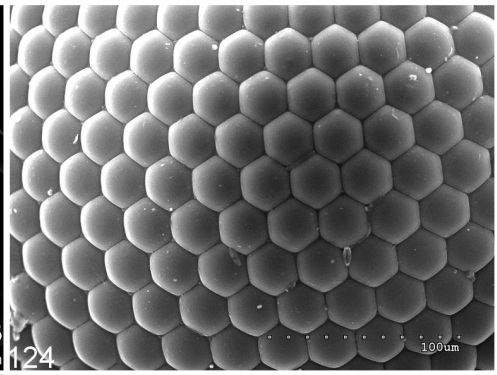
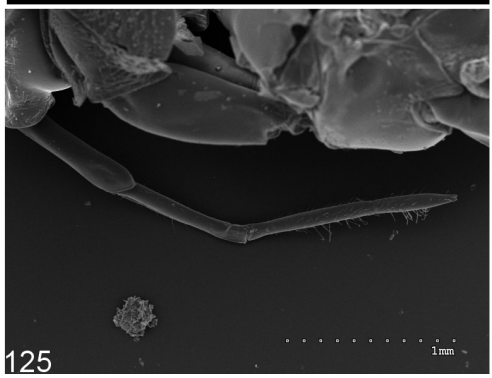
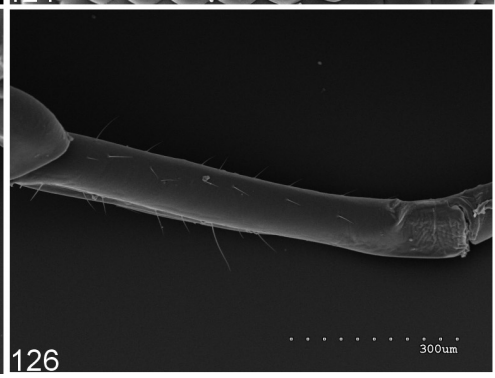
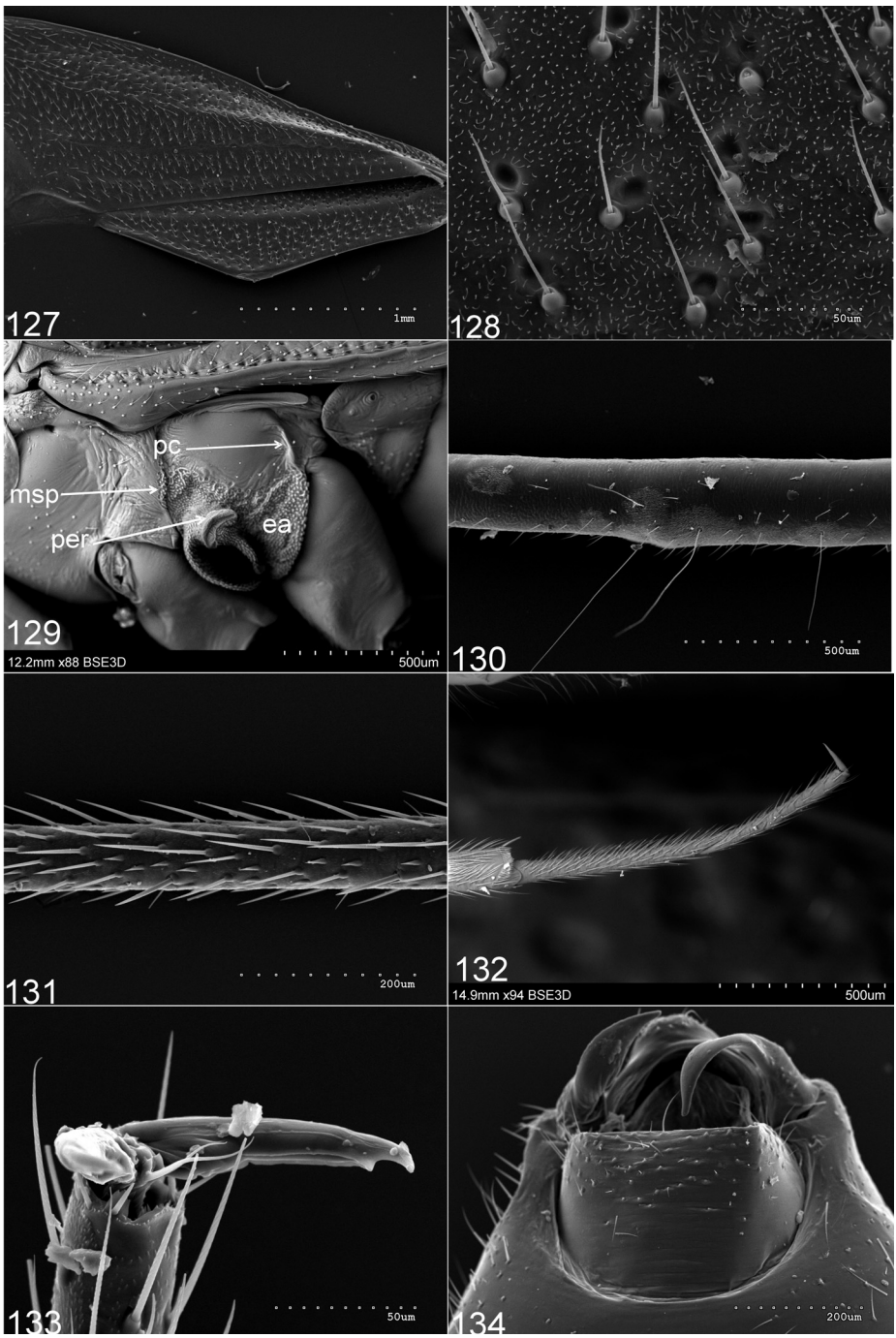

124
100um


125
1mm


126
300um


127
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14.9mm x94 BSE3D
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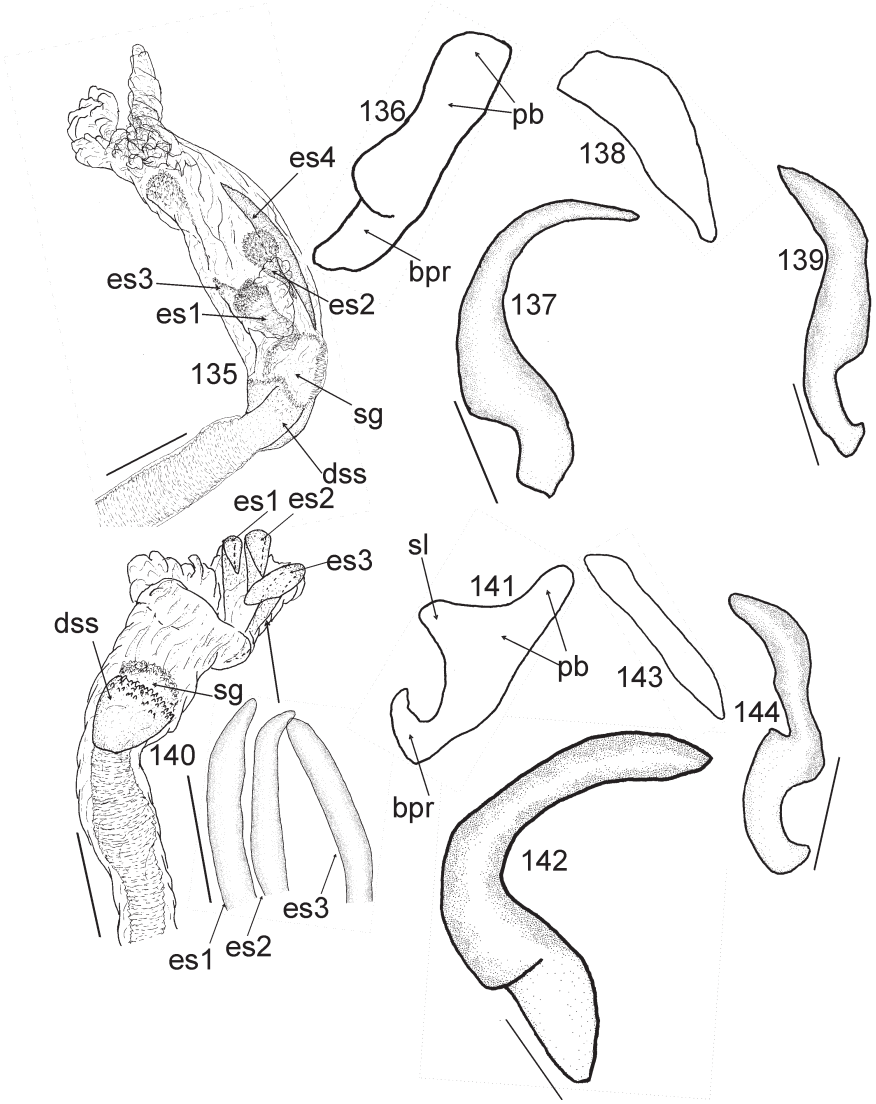
134
200um



Figs 135–144. Male genitalia of *Cylapus tenuicornis* (Say, 1832) (135–139) and *C. tucuruiensis* Carvalho, 1989 (140–144): 135, 140 – endosoma; 136, 141 – left paramere (dorsal view); 137, 142 – left paramere (right lateral view); 138, 143 – apical process of left paramere; 139, 144 – right paramere (left lateral view). Abbreviations: bpr = basal process; dss = sclerotized portion of ductus seminis inside endosoma; es1–4 = endosomal sclerites 1–4; pb = paramere body; sg = secondary gonopore; sl = sensory lobe. Scale bars: 0.1 mm.

Figs 127–134. Scanning electron micrographs of *Cylapus tenuicornis* (Say, 1832): 127, 128 – surface of hemelytron; 129 – thoracic pleura; 130 – metafemur; 131 – vestiture of mesotibia; 132 – protarsus; 133 – pretarsal structure; 134 – genital capsule. Abbreviations: ea = evaporative areas; msp = metathoracic spiracle; pc = posterior carina; per = peritreme.

viewed dorsally broad, with dorsal margin strongly arcuate and ventral margin weakly sinuate; paramere body in dorsal view with dextrolateral margin weakly sinuate and with sinistrolateral margin broadly concave medially, paramere body in lateral view strongly arcuate; sensory lobe weakly developed. *Right paramere* (Fig. 139). Apical process short, sharply pointed; paramere body with dextrolateral margin sinuate and with sinistrolateral margin arcuate.

Female. Similar to male in coloration, structure, and vestiture.

Measurements (in mm). ♂ / ♀. *Body*. Length: 5.50–6.60 / 6.50–6.70, width: 2.00–3.20 / 2.40–2.60. *Head*. Length: 0.50–0.60 / 0.60–0.62, width: 1.25–1.35 / 1.30–1.32, interocular distance: 0.50–0.52. *Antenna*. Length of segment I: 0.87–1.10 / 0.87–0.97, II: 2.30–2.45 / 2.60–2.70, III: 2.70–3.00 / 3.00–3.10, IV: 2.70–3.60 / 4.25–5.00. *Labium*. Length of segment I: 0.82–0.87 / 0.85–0.87, II: 0.82–0.92 / 0.87–0.95, III: 0.70–0.75 / 0.85–0.90, IV: 0.45–0.50 / 0.50–0.55. *Pronotum*. Length: 0.90–1.10 / 1.00–1.10, width of anterior margin: 0.70–1.00 / 1.20–1.30, length of lateral margin: 0.95–1.10 / 1.00–1.10, width of posterior margin: 1.85–2.20 / 2.20–2.30.

Biology. Often observed on fungi on the dead logs (Uhler 1891), probably associated with and feeding on pyrenomycete fungi (Euascomycetes: Xylariaceae) (Wheeler & Wheeler 1994).

Distribution. Canada (Ontario), USA (Connecticut, District of Columbia, Illinois, Indiana, Maryland, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Tennessee, Virginia, West Virginia) (Gorczyca 2006b). Virginia is a new state record.

Remarks. Gorczyca (2006b), based on Henry (1976), indicated that the type of *C. tenuicornis* is destroyed. To ensure stability in nomenclature and to clarify identity of this species I herein designate a male neotype. I take this action under the article 75.1 of the Code (ICZN) which says: "A neotype is the name-bearing type of a nominal species-group taxon designated under conditions specified in this Article when no name-bearing type specimen (i.e. holotype, lectotype, syntype or prior neotype) is believed to be extant and an author considers that a name-bearing type is necessary to define the nominal taxon objectively".

Cylapus tucuruiensis (Carvalho, 1989) new combination

(Figs 54, 55, 65, 140–147)

Cylapocerus tucuruiensis Carvalho, 1989: 83, Figs 7–8 (new species).

Cylapocerus tucuruiensis: Carvalho & Froeschner (1994): 489 (list); Schuh (1995): 21 (catalog); Gorczyca (2006b): 14 (catalog); Schuh (2013) (online catalog).

Type material (not examined). BRAZIL: Pará: 1 ♂, "Tucuruí, Pará, BRASIL, 1979, M. Alvarenga col." (Museu Nacional, Rio de Janeiro, Brazil).

Material examined. VENEZUELA: Amazonas: 1 ♂ 1 ♀, "Venezuela, T. F. Amaz., Cerro de la Neblina Basecamp, 140 m, 0°50′N, 66°10′W, 5 February 1985; Pyrethrin fogging of vine tangle; canopy of flood plain forest along Rio Baria; R. Cocroft & W. Steiner" (USNM).

Diagnosis. Recognized by the following combination of characters: antennal segment II as thick as segment I (Fig. 55); pronotum broadly tinged with red laterally (Figs 54, 55); corium with yellow patch medially (Figs 54, 55); endosoma with three sclerites situated apically; sclerite es1 weakly arcuate, tapering; es2 nearly cylindrical, curved and tapering; es3 cylindrical, basally weakly curved (Fig. 140); left paramere with sensory lobe strongly developed (Fig. 141).

Most similar to *C. amazonicus*, *C. antennatus*, *C. luridus* and *C. marginicollis* in sharing antennal segment II thicker or as thick as segment I (Figs 36, 38, 43, 55). It can, however, be easily distinguished by the shape of the male genitalia.

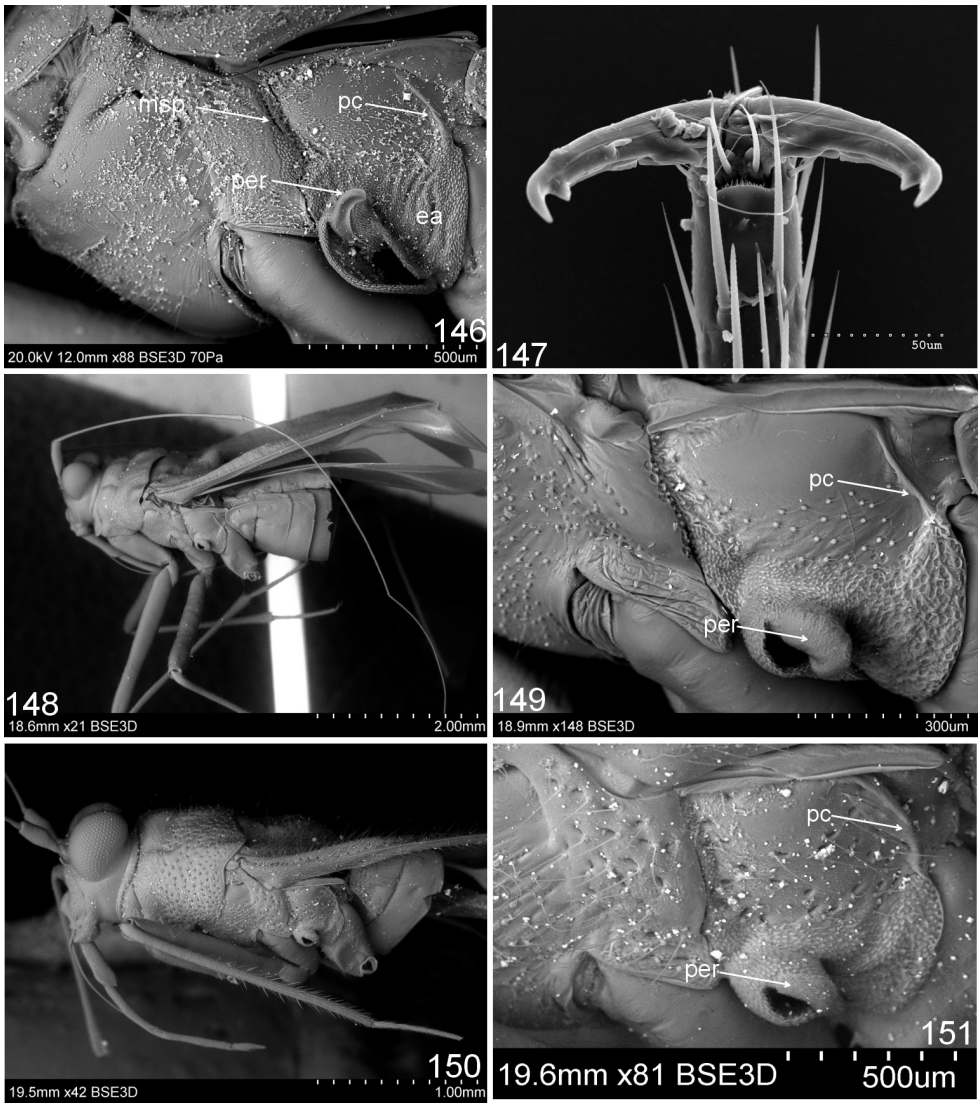
Redescription. ***Male*** (composite description based on Carvalho 1989 and the specimens mentioned below). **Coloration** (Figs 54, 55, 65). Black with red, dark castaneous, and yellow areas. ***Head.*** Vertex dark brown, tinged with yellow; frons, clypeus, mandibular plate, and labrum dark brown black; frons tinged with yellow basally and basolaterally; gula, maxillary plate, and buccula yellow; antenna castaneous to black; segment III with yellowish annulation basally; labium black. ***Thorax.*** *Pronotum* dark castaneous to blackish, tinged with red laterally; collar yellow; humeral angle narrowly yellow. *Mesoscutum and scutellum* castaneous to dark castaneous, narrowly tinged with yellow apically. *Thoracic pleura.* Proepisternum dark brown; proepimeron yellow ventrally, red dorsally; remaining pleura black; posterior margin of mesepimeron yellow along entire length; metathoracic scent gland evaporative area yellow; peritreme fuscous apically. *Hemelytron* castaneous to blackish; corium with transverse, yellow patch medially; outer margin of clavus and inner margin of corium with yellow, narrow stripe along entire length; apical margin of corium and basal margin of cuneus yellow along entire length. *Legs.* Procoxa dark yellow tinged with red; meso- and metacoxae dark castaneous to dark brown, dirty yellow apically; remaining segments brown to dark brown. **Structure, texture and vestiture** (Figs 54, 55, 65, 146, 147). Dorsum covered with relatively long, semirecumbent and erect setae. ***Head.*** Antennal segment II thicker than segment I, gradually becoming narrower toward apex. ***Thorax.*** *Pronotum* covered with relatively long, erect setae; calli moderately developed. *Scutellum* covered with relatively long, erect setae; moderately convex. *Hemelytron* covered with moderately long, semirecumbent setae. ***Male genitalia*** (Figs 140–144). *Aedeagus* (Fig. 140). Endosoma with three sclerites (es1–es3) situated apically; es1 weakly arcuate, tapering; es2 nearly cylindrical, curved and tapering; es3 cylindrical, basally weakly curved. *Left paramere* (Figs 141–143). Apical process thin, with both margins nearly straight, in lateral view apical process broadened basally and tapering; paramere body thin and straight in dorsal view; sensory lobe strongly developed. *Right paramere* (Fig. 144). Apical process obtuse; paramere body broadened and arcuate at apical half, thinner and nearly cylindrical basally; basal process strongly developed, arcuate.

Female. Similar to male in structure, texture, and vestiture. Antennal segment II thinner than segment I, weakly broadened apically.

Measurements (in mm). ♀ / ♂ (*: holotype measurements, taken from Carvalho 1989). *Body*. Length: 6.70–7.20* / 7.0, width: 2.00–2.40* / 2.1. *Head*. Length: 0.40*–0.57 / 0.60, width: 1.35–1.40* / 1.32, interocular distance: 0.50*–0.55 / 0.52. *Antenna*. Length of segment I: 1.20* / 1.15, II: 2.80*–3.65 / 3.00, III: missing / 3.50–4.40*, IV: missing / 3.50–4.40*. *Labium*. Length of segment I: 0.75 / 0.77, II: 0.87 / 0.75, III: immeasurable / 0.87, IV immeasurable / 0.27. *Pronotum*. Length: 0.80*–1.00 / 1.00, width of anterior margin: 1.20 / 1.25, length of lateral margin: 0.95 / 1.05, width of posterior margin: 1.80*–2.00 / 2.00.

Biology. Collected using pyrethrin fogging of vine tangle in canopy of a floodplain forest.

Distribution. Brazil (Pará) (Carvalho 1989), Venezuela (Amazonas) (this paper).



Figs 146–151. Scanning electron micrographs of *Cylapus tucuruiensis* Carvalho, 1989 (146, 147), *Peltidocylapus scutellaris* (Poppius, 1909) (148, 149), and *Valdasus* sp. (150, 151): 146, 149, 151 – thoracic pleura; 147 – pretarsal structure; 148, 150 – lateral view. Abbreviations: ea = evaporative areas; msp = metathoracic spiracle; pc = posterior carina; per = peritreme.

Table 1. Checklist of the genera *Amapacylapus* Carvalho & Fontes, 1968 and *Cylapus* Say, 1832.

Species	Distribution
Amapacylapus amapariensis Carvalho & Fontes, 1968	Brazil (Amapá, Amazonas), Ecuador (Orellana), French Guyana, Guyana (Potaro-Siparuni)
Amapacylapus englemani Carvalho, 1991	Panama (Colón)
Amapacylapus labeculosus (Bergroth, 1922)	Brazil (Amazonas)
Amapacylapus nigricapitis Carvalho, 1986	Brazil (Rondônia)
Amapacylapus rondoniensis Carvalho, 1986	Brazil (Rondônia)
Amapacylapus unicolor sp. nov.	Ecuador (Orellana)
Cylapus amazonicus (Carvalho, 1989)	Bolivia (Cochabamba), Brazil (Pará), Ecuador (Orellana)
Cylapus antennatus (Carvalho & Fontes, 1968)	Bolivia (La Paz), Ecuador (Orellana)
Cylapus brasiliensis Carvalho, 1986	Brazil (Rondônia)
Cylapus citus Bergroth, 1922	Bolivia (La Paz), Brazil (Amazonas, Rondônia), Guyana (Cuyuni-Mazaruni), Peru (Huánuco, Junín, Loreto, Madre de Dios)
Cylapus clavicornis (Poppius, 1909)	Peru (Cuzco)
Cylapus famularis (Stål, 1862)	Mexico
Cylapus festinabundus Bergroth, 1922	Peru
Cylapus funebris (Distant, 1883)	Panama (Chiriquí)
Cylapus luridus sp. nov.	Brazil (Rondônia)
Cylapus marginicollis (Distant, 1883)	Nicaragua, Panama (Chiriquí, Panamá)
Cylapus nobilis Poppius, 1909	Venezuela
Cylapus rondoniensis (Carvalho, 1991)	Brazil (Rondônia)
Cylapus ruficeps Bergroth, 1922	Brazil (Amazonas, Pará), Colombia (Vaupés), Ecuador (Orellana), Venezuela (Amazonas)
Cylapus stellatus (Distant, 1883)	Guatemala
Cylapus striatus Reuter, 1907	Venezuela (Amazonas), Brazil (Mato Grosso, Minas Gerais, Pará, Santa Catarina), Peru (Huánuco), Bolivia (Cochabamba)
Cylapus tenuicornis Say, 1832	Canada (Ontario), USA (Connecticut, District of Columbia, Illinois, Indiana, Maryland, New Jersey, New York, Pennsylvania, Rhode Island, Virginia, West Virginia)
Cylapus tucuruiensis Carvalho, 1989	Brazil (Pará), Venezuela (Amazonas)

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