



Taxonomic Additions to the Neotropical Subgenus *Camponotus* (*Myrmobrachys*) Forel 1912 (Hymenoptera: Formicidae) with Emphasis on the *dimorphus*-Group

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Abstract

We provide updated diagnoses for the *senex*-, *burtoni*- and *dimorphus*-groups of *Camponotus* (*Myrmobrachys*). Dichotomous keys for the *C.* (*Myrmobrachys*) groups and species of the *dimorphus*-group, based on type-specimens are provided. Two new species of the *dimorphus*-group are described, *Camponotus cameloides* sp. nov. and *Camponotus hyalus* sp. nov. We classified *C. dolabratus* and *C. lancifer* as members of the *dimorphus*-group and *C. crassicornis*, *C. subcircularis*, and *C. championi* as members of the *senex*-group. Scanning Electron Microscopy was used to describe the branched pilosity of *C. cameloides* and this is the first description of it for adult workers of Camponotini tribe.

Keywords Camponotini · Scanning Electron Microscopy · New-species · Atlantic Forest · Cerrado

Introduction

Camponotus Mayr, 1861, is one of the most diverse ant genera in the Formicidae and the most speciose within Formicinae. To date, there are 1087 extant species (Bolton 2024). The genus is widely distributed across the northern temperate zones, as well as tropical and subtropical regions of the world (Fernández 2003; Rasoamanana et al. 2017).

The *Camponotus* species occupy a wide variety of microhabitats, both in soil and vegetation, forming numerous colonies (Fernandes et al. 2014). They can nest in the ground, in rotten branches or twigs, or in living wood (Bolton 1973). Some species are referred to as Carpenter ants due to their preference for nesting in decaying wood or abandoned termite galleries (Fernández 2003; Yamamoto and Del-Claro

2008; Fernandes et al. 2014; Oliveira et al. 2017). In urban environments, they can be found nesting in various places such as residences, public squares, or urban parks (Bueno and Campos-Farinha 1999; Campos-Farinha et al. 2002; Oliveira et al. 2017).

Grouped in the tribe Camponotini, *Camponotus* is morphologically characterized by the insertion of the antennae on the head being distant from the posterior edge of the clypeus, mandibles with five to eight teeth, with the third tooth from apex not reduced in size (Bolton 2003; Ward et al. 2016; Fernandez et al. 2019). The taxonomy of species of the genus has been considered challenging. A large number of species, in addition to morphological variation, high level of intraspecific dimorphism/polymorphism, and the variety of shapes and coloration within species have avoiding progress in the *Camponotus* taxonomy (McArthur and Leys 2006; Oliveira et al. 2017; Rasoamanana et al. 2017).

Camponotus (*Myrmobrachys*), one of the 43 subgenera of the *Camponotus*, was designated by Forel in 1912. In this subgenus, Forel (1912) brought together the *senex*-group, distributed in America, with some groups of species from Madagascar. The subgenus was defined with an ambiguous combination of characters, such as short, robust species, with depressed or sub-depressed thorax, bordered or sub-bordered, sometimes bidentate, often covered with pubescence and generally opaque. Emery (1920) revised

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Forel's subgenera proposal, removing the Malagasy species groups from *C. (Myrmobrachys)*, leaving it as exclusively Neotropical. Later, he published the definition of subgenera, presenting a more detailed diagnosis for *C. (Myrmobrachys)*, and dividing it into three groups, *senex*-, *dimorphus*- and *burtoni*- (Emery 1925).

Since then, the groups of *C. (Myrmobrachys)* have not had any taxonomic revision. Recently, Mackay published two works, a taxonomic key for the species distributed in Colombia (Mackay W and Mackay E 2019), and a series of taxonomic keys for the New World, covering the subgenera, some species complexes, and a key to species of the subgenus *Camponotus* (Mackay 2019). However, the keys do not cover the *dimorphus*-group at the species level. According to Mackay W & Mackay E (2019), some species of *Camponotus (Myrmocladoecus)* Wheeler, 1921 are treated as members of *C. (Myrmobrachys)*. In addition, Mackay (2019), does not include *C. (Myrmocladoecus)* in his key and treats it as a junior synonym of *C. (Myrmobrachys)*.

In this study, we present a contribution to the knowledge of *C. (Myrmobrachys)* sensu Emery (1925) taxonomy, with emphasis on the *dimorphus*-group. Specifically, we redefine the subgenus species groups; provide a taxonomic key for the species of the *dimorphus*-group and describe two new species members of the *dimorphus*-group.

Material and methods

Material examined

Type specimens were examined through high-resolution images from the MCZbase: The Database of the Zoological Collections at the Museum of Comparative Zoology of Harvard, the Smithsonian's digital collections, and AntWeb version 8.103.2 (Tab. 1). The acronyms for the collections where the type specimens are deposited, as well as those for the specimens that were examined in person, are listed below:

- o **BMNH**—Natural History Museum, London, England, U.K.
- o **CELC**—Coleção Entomológica do Laboratório de Sistemática e Biologia de Coleoptera da Universidade Federal de Viçosa, Minas Gerais, Brazil.
- o **DZUP**—Coleção Entomológica Padre Jesus Santiago Moure, Curitiba, Paraná, Brazil.
- o **JLCT**—John T. Longino Collection, Utah, USA.
- o **MCZ**—Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA.
- o **MHNG**—Muséum d'Histoire Naturelle, Geneva, Switzerland.

- o **MPEG**—Museu Paraense Emílio Goeldi, Belém, Pará, Brazil.
- o **MSNG**—Museo di Storia Naturale Giacomo Doria, Genova, Italy.
- o **MZSP**—Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.
- o **NHMW**—Naturhistorisches Museum, Vienna, Austria.
- o **NMNH**—National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.
- o **PSWC**—Phil S. Ward Collection, University of California, Davis, CA, USA.
- o **SDEI**—Deutsches Entomologisches Institut Senckenberg, Müncheberg, Germany.

Measurements

Measurements were taken in stereomicroscopes with a millimetric ruler attached to the ocular lens. All measurements are given in mm and the minimum and maximum values for the paratypes. Detailed information is in Supplementary Information 1. Measurements definitions and abbreviations used are listed below and represented in Fig. 1.

- o **CL** (Clypeus Length): Length of clypeus medially in clypeus full-face view, the posterior and anterior margins were at the same focus.
- o **CW** (Clypeus Width): Width between the tentorial pits in clypeus full-face view, the posterior and anterior margins were at the same focus.
- o **EL** (Eye Length): Length of the right eye in full view of the eye from the anteriormost to the posteriormost points of the eye perimeter.
- o **HL** (Head Length): = HMdL + CL.
- o **HMdL** (Head Middle Length): Length from the middle point of epistomal suture to the posterior margin of the head.
- o **HW**: Maximum width of head in full-face view under eyes.
- o **GL** (Gaster Length): The visible anteriormost point in lateral view, to the posteriormost point.
- o **ML** (Mandible Length): Length measured in full face view from the lateral posteriormost point of the outer margin of the mandible to the tip of the apical tooth.
- o **LHL** (Lateral Head Length): Length from the anteriormost point of the lateral head portion in full-face view, perpendicular to the HW, to the posteriormost point.
- o **SL** (Scape Length): Length of right scape in dorsal view, from anteriormost point, excluding radicle, to the apex.
- o **PtH** (Petiole Height): The tallest vertical measurement from the apex of the node to the sternite, with petiole in profile view.

Table 1 Species list of the *Camponotus (Myrmobrachys) dimorphus*-group, their respective subspecies, synonyms, and examined type specimens. Valid species are bold and an asterisk marks species added to the *dimorphus*-group

Species/Subspecies/Synonyms	Specimen code	N minor/major	Type Status	Source	Collection
<i>Camponotus abscisus</i> Roger, 1863*	-	-	-	-	-
<i>Camponotus caracalla</i> Forel 1912	CASENT0910725	1w minor	lectotype	AntWeb	MHNG
<i>Camponotus circularis</i> Mayr, 1870	CASENT0910727	1w minor	syntype	AntWeb	MHNG
	CASENT0915788	1w minor	syntype	AntWeb	NHMW
<i>Camponotus circularis rufitibia</i> Emery 1920	CASENT0905525	1w minor	syntype	AntWeb	MSNG
<i>Camponotus dimorphus</i> Emery, 1894	CASENT0905522	1w major	syntype	AntWeb	MSNG
	CASENT0905523	1w minor	syntype	AntWeb	MSNG
	USNMENT00529166	1w minor	syntype	NMNH	NMNH
<i>Camponotus dolabratus</i> Menozzi, 1927*	FOCOL0118-1	1w minor	syntype	AntWeb	SDEI
	FOCOL0118-2	1w minor	syntype	AntWeb	SDEI
	FOCOL0118-3	1w minor	syntype	AntWeb	SDEI
	FOCOL0119	1w minor	syntype	AntWeb	SDEI
<i>Camponotus elevatus</i> Forel 1899	CASENT0910728	1w major	lectotype	AntWeb	MHNG
	CASENT0910729	1w minor	paralectotype	AntWeb	MHNG
<i>Camponotus iheringi</i> Forel, 1908	CASENT0910730	1w major	lectotype	AntWeb	MHNG
	CASENT0910731	1w minor	paralectotype	AntWeb	MHNG
	CASENT0910732	1w minor	syntype	AntWeb	MHNG
<i>Camponotus bajulus</i> Emery 1925 syn. jr	-	-	-	-	-
<i>Camponotus lancifer</i> Emery, 1894*	CASENT0905477	1 w minor	lectotype	AntWeb	MSNG
<i>Camponotus pachylepis</i> Emery 1920	CASENT0905520	1w minor	lectotype	AntWeb	MSNG
<i>Camponotus propinquellus</i> Emery 1920	CASENT0905518	1w minor	lectotype	AntWeb	MSNG
<i>Camponotus propinquus</i> Mayr, 1887	CASENT0915799	1w minor	lectotype	AntWeb	NHMW
<i>Camponotus propinquus baretoi</i> Santschi, 1922	-	-	-	-	-
<i>Camponotus paris</i> Forel 1912 syn. jr	CASENT0910733	1w major	syntype	AntWeb	MHNG
<i>Camponotus scissus</i> Mayr, 1887	CASENT0915802	1w minor	lectotype	AntWeb	NHMW
<i>Camponotus striatus</i> (Smith, 1862)	CASENT0903642	1w minor	holotype	AntWeb	BMNH
<i>Camponotus alfaroi</i> Emery, 1890 syn. jr	-	-	-	-	-
<i>Camponotus granulatus</i> (Pergande, 1896) syn. jr	-	-	-	-	-
<i>Camponotus wytsmani</i> Emery 1920	CASENT0905524	1w major	lectotype	AntWeb	MSNG

- o **PtL** (Petiole Length): Distance from the anteriormost visible point of the petiolar node to the upper posteriormost point of articulation with helcium in profile.
- o **PpH** (Propodeum Height): Vertical measurement that goes from the posteriormost lower point of the propodeum in profile, to the perpendicular point of PpL considering the highest point of the propodeal dorsum.
- o **PpL** (Propodeum Length): Horizontal measurement that goes from the anterior margin of the propodeum in profile, to the perpendicular point of PpH considering the posteriormost lower point of the propodeum.

TL(Total Length) := ML + HL + WL + PtL + GL.

- o **WL** (Weber's Length): Diagonal measurement of mesosoma in lateral view, from the anteriormost point of pronotum, excluding the pronotal collar, to the posteriormost lower point of metapleuron.

CI(Cephalic Index) := HW/HL x 100

ClyI(Clypeus Index) := CW/CL x 100

PpI(Propodeum Index) := PpL/PpH x 100

SI(Scape Index) := SL/HW x 100

Descriptions

Morphological terminology follows Delsinne et al. (2019). The notopropodeal sulcus refers to the mesosomal concavity between the mesonotum and propodeum when it is as long, or longer than the metathoracic spiracle. Integument sculpturing follows Harris (1979). Pilosity terms mostly follow Ulysséa and Brandão (2021). Names of new species follow

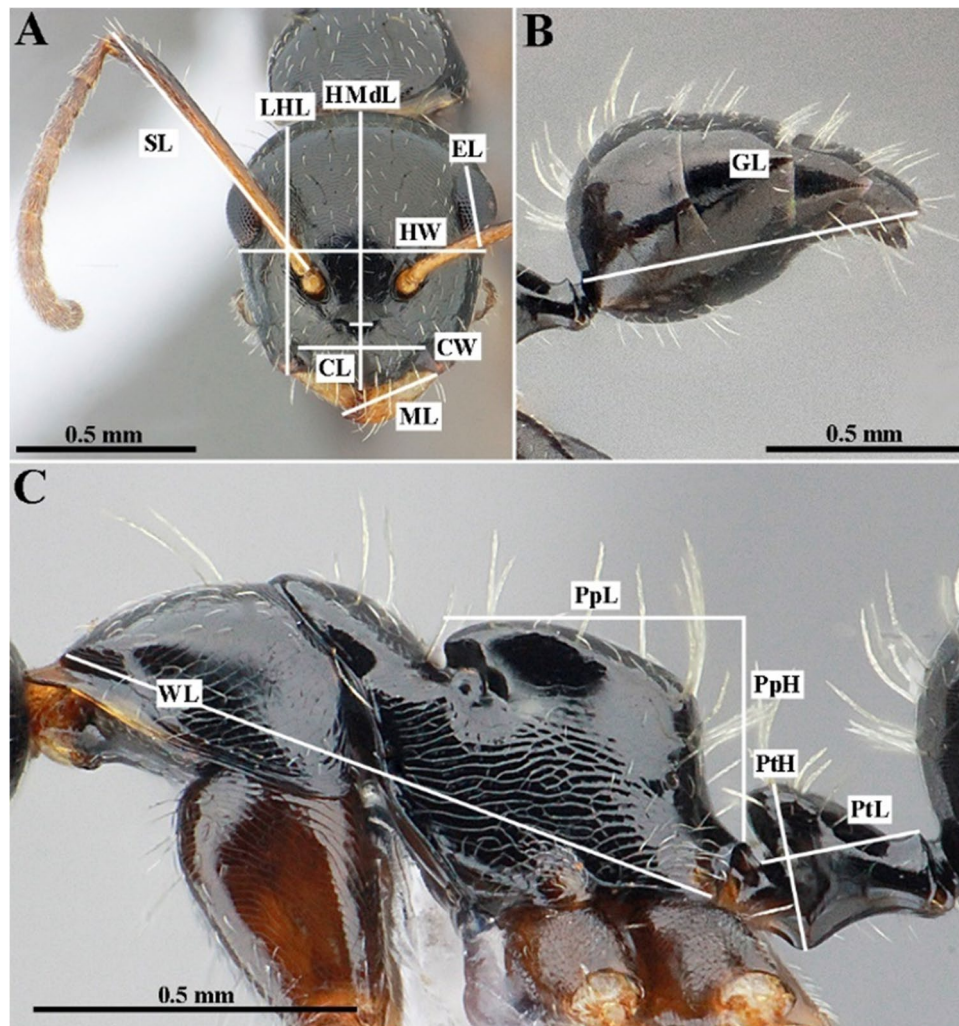


Fig. 1 *Camponotus dimorphus*-group measurements represented on *C. scissus* (UFV-LABECOL-000074, authorship: April Nobile, available at AntWeb.org). **A**, head in frontal view; **B**, full body in lateral view. White lines represent the measurements

recommendations by Vendetti and Garland (2019) and epithets were chosen using Hedgpeth (1954).

Images

High-resolution images were taken from AntWeb. Additional images for the dichotomous key and of *C. hyalus* sp. nov. were taken with a Zeiss Discovery V20, coupled with an Axiocam 305 camera, using Zen 2.3 software. Images of *C. cameloides* sp. nov. were taken with a Leica S8APO with a 2× auxiliary lens, coupled with a Canon 1100D. Illumination was made with an adaptation of the scalable and modular illumination system presented in Kawada and Buffington (2016). Image stackings were done with Zerene 1.04 Build T2023-06-11-1120. Editing was done in GIMP; some scale bars were added in ImageJ (Schneider et al. 2012) through measurements of the body. For the Scanning

Electron Microscopy (SEM), the specimen was fragmented so that the structures could be better explored, then they were covered with gold, attached to aluminum stubs with a double-faced conductive adhesive tape, and fixated on stubs. We obtained SEM images using a Tescan Mira3 FEG (field emission gun) at the Laboratório de Microscopia Eletrônica at MPEG.

Distribution maps

The distribution map of the new species was produced using QGIS 3.28.11- firenze (QGIS Development Team 2023), with geographic coordinates from the specimen labels. The shapefiles of Brazil's administrative boundaries and Brazilian biomes were provided by the Instituto Brasileiro de Geografia e Estatística (IBGE <www.ibge.gov.br>), while the Campo Rupestre shapefile was provided by Silveira et al. (2016).

Results

- o **Order:** Hymenoptera Linnaeus, 1758
- o **Family:** Formicidae Latreille, 1809
- o **Subfamily:** Formicinae Latreille, 1802
- o **Tribe:** Camponotini Forel, 1878
- o **Genus:** *Camponotus* Mayr, 1861
- o **Subgenus:** *Camponotus* (*Myrmobrachys*) Forel 1912

Diagnosis Minor worker relatively small compared to most Neotropical *Camponotus* species. Head in full-face view trapezoidal, anterior portion narrower than posterior; lateral margin straight to convex; occipital corner rounded or forming blunt angle. Clypeus wider than long, usually with median portion elevated, forming broad and low, weak longitudinal carina. Eye reaching lateral margin; usually convex. Mesosoma relatively short, about as long as gaster, or slightly more; dorsal profile of mesosoma forming two distinct convexities, separated by well-developed notopropodeal sulcus or relatively deep suture. Pronotum with distinct dorsal and lateral faces, blunt or sharply marginated; pronotal dorsum usually straight to slightly convex. Propodeum without projections. Major worker differing from minor worker by: head shape varies from trapezoid, subrectangular or subquadrate with more convex lateral margin; eye less convex, reaching or not lateral margin, but never surpassing it. Pronotal dorsum in lateral view more convex than in minor worker.

senex-group Mesonotal dorsal margin in lateral view continuous, propodeum not separated from mesonotum by sulcus or constriction, at most by fine line; pronotum sharply marginate; propodeum usually longer than high. Propodeum in lateral view with distinct dorsal and posterior margins, meeting in an angle; posterior margin deeply concave to straight (except *C. championi*). *Camponotus abscisus*, *C. arboreus*, *C. auricomus*, *C. beebei*, *C. biolleyi*, *C. brasiliensis*, *C. brettesi*, *C. brevis*, *C. cameranoi*, *C. canescens*, *C. championi* new combination, *C. cheesmanae*, *C. conulus*, *C. crassicornis*, *C. crassus*, *C. cuneidorsus*, *C. excisus*, *C. formiciformis*, *C. godmani*, *C. guayapa*, *C. kutterianus*, *C. lindigi*, *C. mina*, *C. mus*, *C. normatus*, *C. peper*, *C. phytophilus*, *C. piceatus*, *C. pittieri*, *C. planatus*, *C. rubrithorax*, *C. scipio*, *C. senex*, *C. socorroensis*, *C. sphenoidalis*, *C. subcircularis*, *C. textor*, *C. trapezoideus*, *C. trepidulus*, *C. yala*, *C. zoc*.

burtoni-group Mesosoma higher than long. Dorsal margin of mesonotum in lateral view continuous with propodeum. Propodeum in lateral view higher than long. Unique species, *C. burtoni*.

dimorphus-group Dorsal margin of mesonotum in lateral view discontinuous, notopropodeal sulcus as long as or longer than spiracle length. Pronotum and mesonotum forming convex surface, sometimes mesonotum higher than pronotum anteriorly. Propodeum always rounded in lateral view, dorsal and posterior margin continuous sometimes forming blunt obtuse angle; posterior margin convex to slightly concave ventrally. Species list see Table 1.

Comments No type specimens of *C. abscisus* were studied, but according to the redescription by Forel (1884), *C. abscisus* has the mesonotum separated from the propodeum by a deep and wide constriction, morphology that would make a member of the *dimorphus*-group. Still, according to Forel (1884), the propodeum (called by him as metanotum) of *C. abscisus* is high, as wide as long and short. In the original description of *C. elevatus*, Forel (1899) argues that *C. elevatus* has the propodeum higher than the mesonotum, the body color and sculpturing are weaker than in *C. abscisus*, which presumably does not have the propodeum higher than the mesonotum. One major worker of *C. abscisus* identified by Mackay in 1997 on AntWeb (CASENT0217599) was observed (AntWeb 2024). This specimen is similar to the type specimens of *C. elevatus*, but the propodeum is at the same level as the mesonotum, the clypeus is truncate and the anterior head portion is yellowish. These characters justify the identification done by Mackay. Even though we consider the major worker identified by Mackay in 1977 has the typical morphology of *C. abscisus*, we are not sure if the propodeal height of the workers is a character stable enough to separate *C. abscisus* from *C. elevatus*. There are two minors and one major worker at JTLC (respectively CASENT0280101, CASENT0882061 and CASENT0280100) identified as *C. abscisus*. Looking at the propodeal height in relation to the mesonotum level of these specimens, they seem to be transitional forms between what Mackay in 1997 considered as *C. abscisus* and the type specimens of *C. elevatus*. Considering that we did not have access to the type specimen of *C. abscisus*, which is a gyne, or the specimens on which Forel (1884) based his redescription, we cannot be sure about the morphology of *C. abscisus* and the diagnostic characters that separate it from *C. elevatus*. On the other hand, we also cannot synonymize *C. elevatus* under *C. abscisus* for the same reasons. To avoid misidentifications, we decided not to include *C. abscisus* in the key, given its ambiguous species boundaries. We chose to keep *C. elevatus* in the key because of the availability of type specimen images which reference the morphology of this species.

According to Emery (1925), the *senex*- and *dimorphus*- groups can be distinguished mainly by the shape of the mesosoma, which is continuous in *senex*- and discontinuous in *dimorphus*-group. Despite this reliable diagnostic

characteristic, some species do not conform to it. *Camponotus crassicornis*, *C. subcircularis*, and *C. championi*, according to Emery (1925), are members of the *dimorphus*-group. Considering that their mesosomata are not discontinuous, and the posterior faces of the propodeum are concave, we reclassify these species into the *senex*-group. In the case of *C. championi*, the dorsal and lateral margins of the propodeum, in a lateral view, are continuous and form an obtuse angle, resembling some species of the *dimorphus*-group. Nevertheless, their mesosomal dorsal margin is continuous. On the other hand, *C. dolabratus* has a discontinuous dorsal margin, and thus, we reclassified it into the *dimorphus*-group.

The *Camponotus (Myrmosphincta)* Forel 1912 species also have a discontinuous mesosomata, but the head is oval to elongate and the mesosoma is usually longer than the gaster (Emery 1925; França pers. obs.). *Camponotus lancifer*, which is a member of *C. (Myrmosphincta)*, should be considered a member of *C. (Myrmobrachys)* due to the subtrapezoidal head, wider than long clypeus, and the mesosoma as long as the gaster. Since a well-developed notopropodeal sulcus separates the mesonotum from the propodeum, and then placed in the *dimorphus*-group.

Key for the species groups of *Camponotus (Myrmobrachys)* based on minor workers

1—Dorsal profile of mesosoma in lateral view forming a single convexity. Mesonotum continuous with the propodeum or separated from it by a shallow impression (Fig. 2a) 2
 1' Dorsal profile of mesosoma in lateral view forming two distinct convexities. Mesonotum separated from the propodeum by a well-developed notopropodeal sulcus or a deep suture (Fig. 2b and c) *dimorphus*-group

2 (1)—Mesosoma longer than high, in lateral view (Fig. 3a). Mesonotum as long as the dorsal propodeal margin and separated from it by a well-developed suture *senex*-group
 2'—Mesosoma higher than long, in lateral view (Fig. 3b). Mesonotum and dorsal propodeal margin narrow, separated each other by vestigial suture *C. burtoni*

Key for the species of the *dimorphus*-group based on minor workers

1—Mesonotum separated from propodeum by well-developed notopropodeal sulcus in lateral view (Fig. 2c), as long as metathoracic spiracle, or more, in dorsal view 2
 1'—Mesonotum separated from propodeum by deep suture in lateral view; impression shorter than metathoracic spiracle in dorsal view (Fig. 2b) 7
 2 (1)—Notopropodeal sulcus as long as the propodeal dorsum (Fig. 4a). Petiolar node in lateral view subquadrate; anterior margin meeting the dorsal margin in a blunt angle; posterior margin distinct and straight
 *C. cameloides* sp. nov
 2' Notopropodeal sulcus shorter than the propodeal dorsum (Fig. 4b). Petiolar node in lateral view varying in shape, but never subquadrate 3
 3 (2')—Lateral face of pronotum coarsely punctate. Petiolar node apically acute in lateral view; anterior and posterior faces separated by sharp edges dorsally (Fig. 4b)
 *C. lancifer*
 3'—Lateral face of pronotum smooth and shining, at most with weak and sparse punctures or imbrications. Petiolar node in lateral view of different shapes, never acute; anterior and posterior faces not separated by sharp edges dorsally (Fig. 3a, 5a, and b) 4

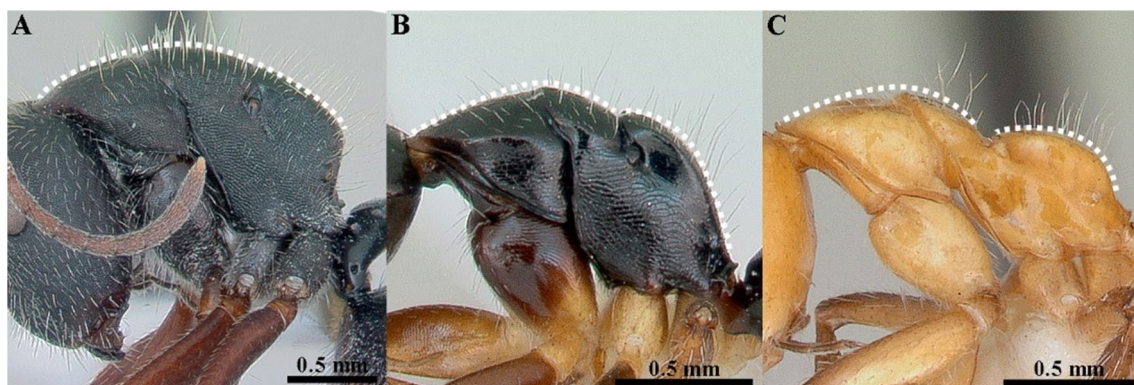


Fig. 2 *Camponotus* mesosoma in lateral view. **A**, *C. crassus* (CASENT0173407, authorship: April Nobile, available at AntWeb.org); **B**, *C. iheringi* (CASENT0173425, authorship: April Nobile, available at AntWeb.org); **C**, *C. dimorphus* (CASENT0173412, authorship: April Nobile, available at AntWeb.org). Dashed lines highlight the mesosoma shapes

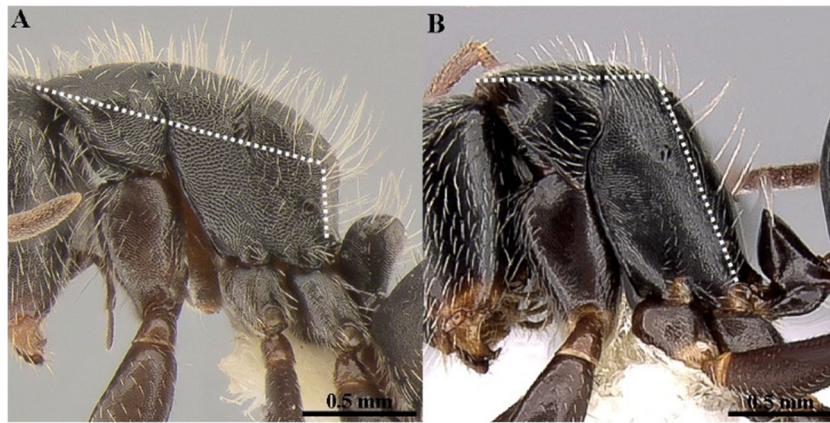


Fig. 3 *Camponotus* mesosoma proportions in lateral view. **A**, *C. senex* (CASENT0882303, authorship: Zachary Griebenow, available at AntWeb.org); **B**, *C. burtoni* (CASENT0280120, authorship: Estella Ortega, available at AntWeb.org). Dashed lines represent mesosoma length and height

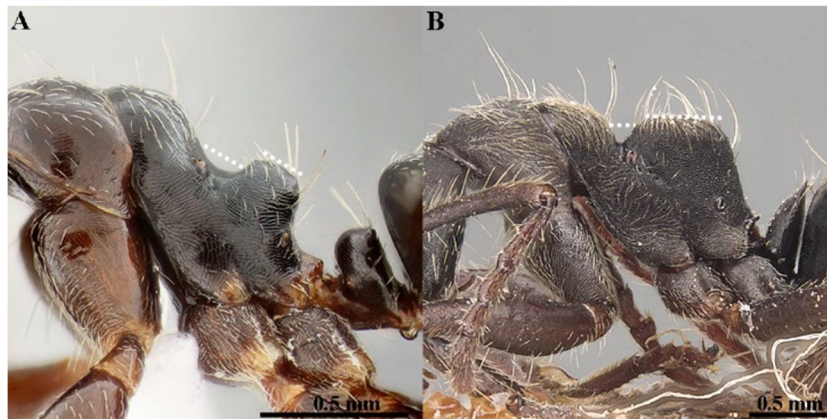


Fig. 4 *Camponotus* pronotal sculpturing and notopropodeal sulcus width in lateral view. **A**, *C. camelooides* sp. nov. holotype; **B**, *C. lancifer* lectotype (CASENT0905477, authorship: Will Ericson, available at AntWeb.org). Dashed lines highlight notopropodeal sulcus widths and propodeal lengths

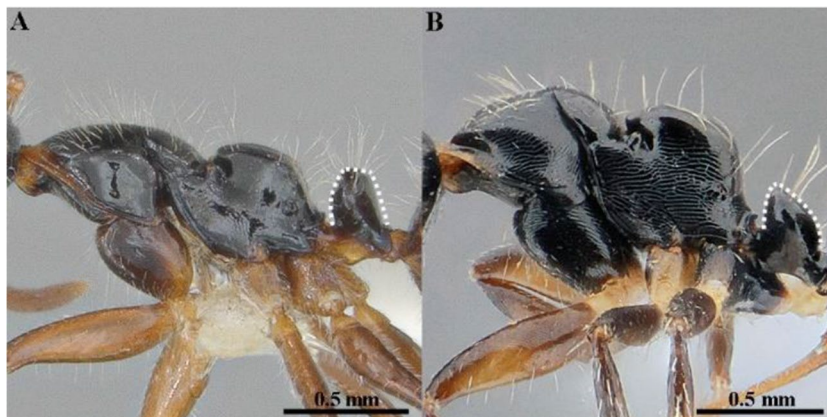


Fig. 5 *Camponotus* meso and metapleural sculpturing and petiole node shapes in lateral view. **A**, *C. hyalus* sp. nov. holotype; **B**, *C. scissus* (UFV-LABECOL-000072). Dashed lines represent petiole node shape

- 4 (3')—Propodeum distinctly marginate, dorsal and lateral faces separated by blunt edges. Petiolar node not scale-like 5
- 4'—Propodeum not marginate, dorsal face gradually curving to the lateral face. Petiolar node scale-like 6
- 5 (4)—Meso and metapleuron smooth and shining. Dorsum of propodeum wider than long in dorsal view. Petiole node in lateral view with anterior and dorsal margins meeting in an obtuse blunt angle (Fig. 5a)..... *C. hyalus* sp. nov.
- 5'—Meso and metapleuron coarsely imbricate to costulate. Dorsum of propodeum longer than wide in dorsal view. Petiole node in lateral view with anterior and dorsal margins meeting in an acute blunt angle (Fig. 5b) *C. scissus*
- 6 (5')—Head and mesosoma surfaces smooth and shining (Fig. 6a). Body color bright yellow to orange *C. dimorphus*
- 6'—Head and mesosoma surfaces punctate or imbricate (Fig. 6b). Body color predominantly dark-brown with anterior portion of head and appendages pale yellow *C. dolabratus*
- 7 (1')—Propodeum distinctly marginate, lateral faces separated from dorsal and posterior faces by sharp edges (Fig. 7a) 8
- 7'—Propodeum not marginate or, at most, with anterior portion marginate, lateral faces continuous with dorsal and posterior faces (Fig. 7b) 11
- 8 (7)—Head in frontal view elongate. Frontal carinae strongly convex posteriorly. Eye globular. (Fig. 8a). Mesosoma smooth and shining *C. wytsmani*
- 8'—Head in frontal view not elongate. Frontal carinae parallel. Eye convex. (Fig. 8b). Mesosoma sculptured 9

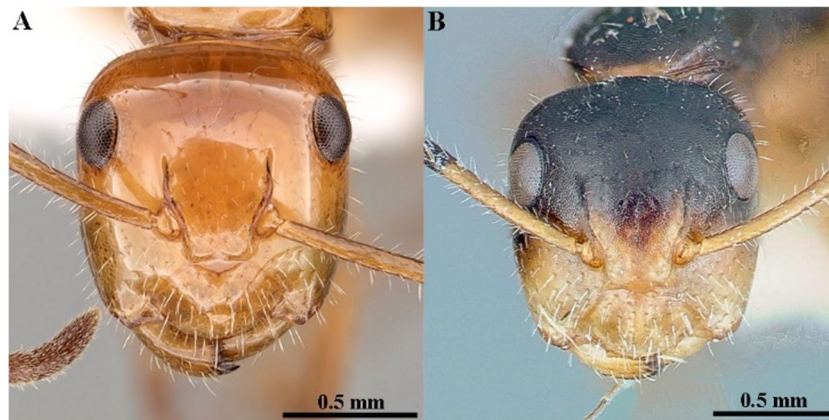


Fig. 6 *Camponotus* head sculpturing in frontal view. **A**, *C. dimorphus* (CASENT0280124, authorship: Estella Ortega, available at AntWeb.org); **B**, *C. dolabratus* syntype (FOCOL0118-2, authorship: Christiana Klingenberg, available at AntWeb.org)

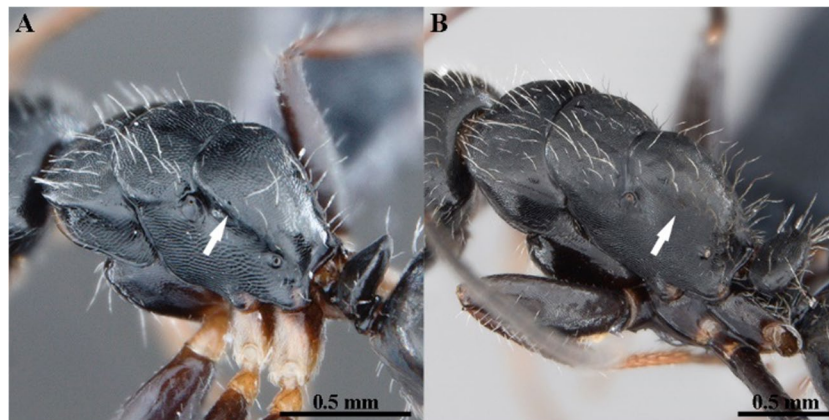


Fig. 7 *Camponotus* propodeum in latero-oblique view. **A**, *C. iheringi*; **B**, *C. caracalla*

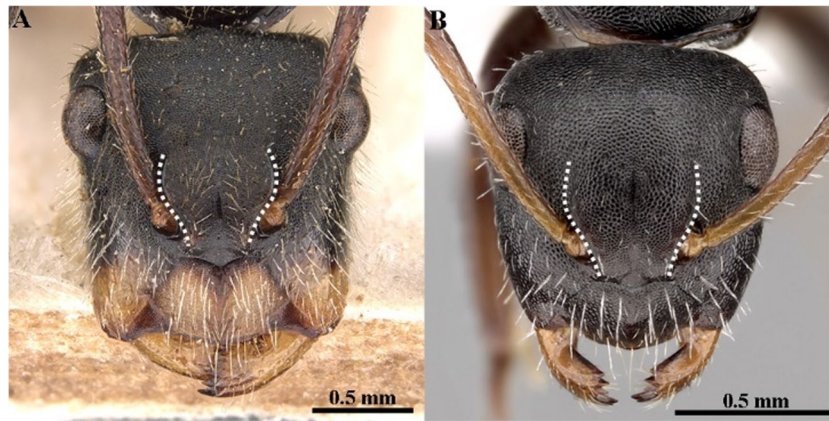


Fig. 8 *Camponotus* head in frontal view. **A**, *C. wytsmani* syntype (CASENT0905524, authorship: Will Ericson, available at AntWeb.org); **B**, *C. striatus* (CASENT0280122, authorship: Estella Ortega, available at AntWeb.org). Dash lines highlight the frontal carinae shape

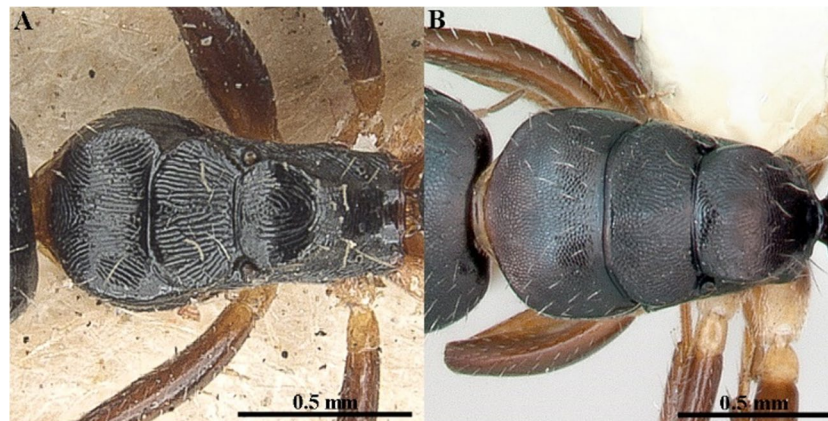


Fig. 9 *Camponotus* mesosoma in dorsal view. **A**, *C. striatus* syntype (CASENT0903642, authorship: Will Ericson, available at AntWeb.org); **B**, *C. iheringi* (CASENT0173425, authorship: April Nobile, available at AntWeb.org)

9 (8')—Mesosoma costulate (Fig. 9a). Petiolar node subquadrate in lateral view 10
 9' Mesosoma not costulate (Fig. 9b). Petiolar node subtriangular in lateral view *C. iheringi*
 (10) Pro and mesonotum at the same level of propodeum in lateral view. Propodeum dorsum convex in lateral view..... *C. striatus*
 10' Pro and mesonotum higher than propodeum in lateral view. Propodeum dorsum straight, at most slightly convex, in lateral view *C. circularis*
 11 (7')—Propodeal dorsum strongly convex anteriorly. Petiolar node scale-like in lateral view, anterior and dorsal margins continuous, forming single convexity (Fig. 10a)
 *C. elevatus*
 (see *dimorphus*-group comments section about *C. abscisus*).

11'—Propodeal dorsum slightly convex anteriorly. Petiolar node trapezoidal in lateral view, anterior and dorsal margin forming an angle; node higher posteriorly (Fig. 10b and c).....12
 12 (11')—Petiolar node subtrapezoidal in lateral view, higher posteriorly (Fig. 10b and c)13
 12'—Petiolar node not subtrapezoidal in lateral view, higher medially14
 13 (12)—Propodeum dorsum straight to convex in lateral view; posterior margin straight. Petiolar node inclined anteriorly in lateral view (Fig. 10b) *C. caracalla*
 13—Propodeum dorsum lower posteriorly in lateral view; posterior margin concave. Petiolar node not inclined anteriorly in lateral view (Fig. 10c) *C. pachylepis*

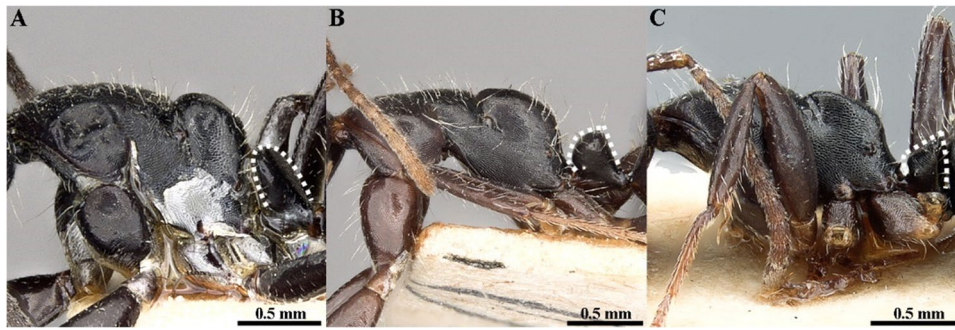


Fig. 10 *Camponotus* propodeum height and petiolar node shapes in lateral view. **A**, *C. elevatus* paralectotype (CASENT0910729, authorship: Alexandra Westrich); **B**, *C. caracalla* lectotype (CASENT0910725, authorship: Z. Lieberman, available at AntWeb.org); **C**, *C. pachylepis* lectotype (CASENT0905520, authorship: Z. Lieberman, available at AntWeb.org). Dashed lines represent petiolar node shapes

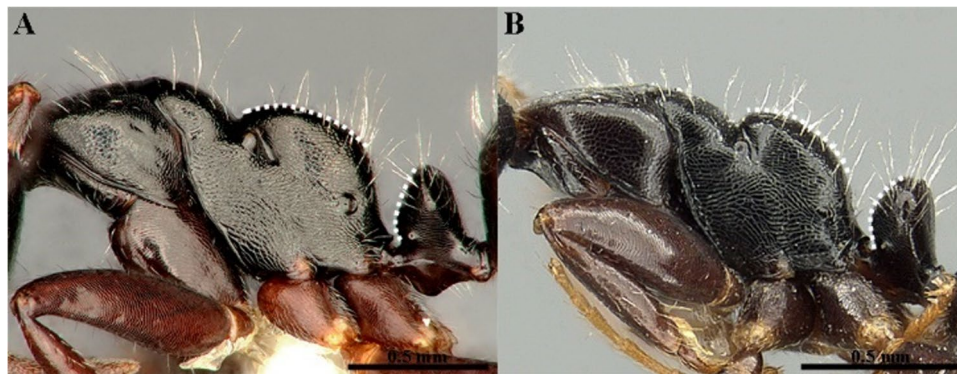


Fig. 11 *Camponotus* propodeal dorsum and petiole anterior margin in lateral view. **A**, *C. propinquellus* (CASENT0884449, authorship: Z. Lieberman, available at AntWeb.org); **B**, *C. propinquus* lectotype (CASENT0915799, authorship: Harald Bruckner, available at AntWeb.org). Dashed lines representing propodeal dorsum and anterior petiole margin shape

14 (12')—Propodeal dorsum only 1/3 descending posteriorly in lateral view. Petiolar node with anterior margin curving near to spiracle (Fig. 11a) *C. propinquellus*
 14'—Propodeal dorsum descending 2/3 posteriorly in lateral view. Petiolar node with anterior margin curving distant from the spiracle (Fig. 11b) *C. propinquus*

Camponotus (Myrmobrachys) cameloides França, Cubillos, Chaul, Prado & Lattke.
 (Figs. 4a, 12 and 13).

Type specimens

Holotype worker. BRAZIL: Minas Gerais: Parque Nacional da Serra do Cipó, Capão dos Palmitos, -19.369074 -43.616814, vii.2014—iii.2015, Fieto, L. col., C4 A2 54P [arboreal pitfall] (DZUP, UFV-LABECOL-009812).
Paratype workers. Same data as holotype (11 at CELC:

UFV-LABECOL-009224, UFV-LABECOL-009705, UFV-LABECOL-009225, UFV-LABECOL-009235, UFV-LABECOL-009216, UFV-LABECOL-009227, UFV-LABECOL-009232, UFV-LABECOL-009228, UFV-LABECOL-009237, UFV-LABECOL-009229, UFV-LABECOL-009226; one at INPA: UFV-LABECOL-009223; one at DZUP: C1 A11 14S.1 UFV-LABECOL-009231; one at MPEG: UFV-LABECOL-010053; two at MZUSP: UFV-LABECOL-009236, UFV-LABECOL-009670; one at PSWC: ANTWEB1032633).

Etymology

The specific epithet *cameloides* (from the Latin words *camelus*, meaning “camel”, + *oides* suffix, meaning “resembling, having the form of”) is a singular and masculine adjective in the nominative case. It refers to the remarkable mesosomal shape of this species that resembles a camel's back.



Fig. 12 *Camponotus cameloides* holotype. **A**, head in full-face view; **B**, specimen labels; **C**, full dorsal view; **D**, full lateral view

Diagnosis

Pronotum not marginate, humeral angles blunt. Mesonotum convex, not separated posteriorly from the notopropodeal sulcus by a suture; in lateral view, not separated from the mesopleuron by a suture. Notopropodeal sulcus almost as long as propodeum in lateral view. Propodeum lower than mesonotal level; convex, shorter and narrower than mesonotum. Petiolar node subquadrate in lateral view, anterior and dorsal margins meeting in a blunt angle.

Minor worker

Measurements and Indexes

Holotype CL 0.31; CW 0.50; EL 0.28; LHL 0.84; HMdL 0.74; HL 1.05; HW 0.90; GL 1.46; ML 0.40; SL 0.93; PtH 0.34; PtL 0.22; PpH 0.28; PpL 0.25; WL 1.21; TL 4.34. CI 85.71; ClyI 161.29; PpI 89.28; SI 103.33.

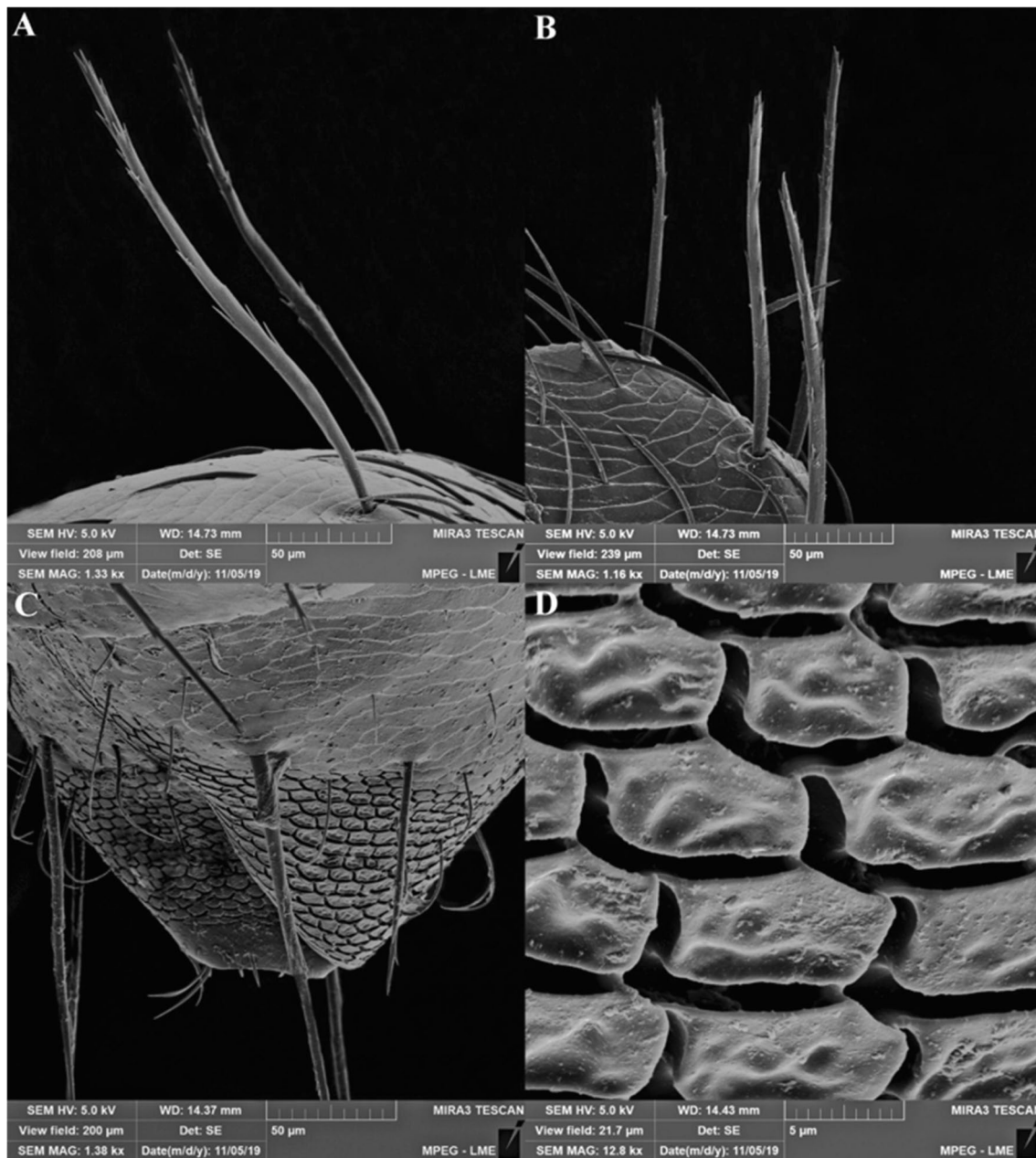


Fig. 13 Scanning Electron Microscopy of *C. cameloides* (UFV-LABECOL-009230). **A**, pronotum hairs in lateral view; **B**, propodeum hairs in lateral view; **C**, pygidium in dorsal view; **D**, pygidial sculpturing in detail

Paratypes CL 0.25–0.27; CW 0.49–0.57; EL 0.28–0.30; LHL 0.84–0.97; HMdL 0.70–0.75; HL 0.97–1.02; HW 0.87–1.00; GL 1.33–1.70; ML 0.43–0.50; SL 0.90–0.98; PtH 0.28–0.37; PtL 0.20–0.24; PpH 0.30–0.38; PpL 0.21–0.28; WL 1.18–1.35; TL 4.13–4.77. CI 85.29–103.09; ClyI 175–220; PpI 61.76–93.33; SI 94.84–103.44.

Head. Sub-trapezoidal in frontal view, anteriorly narrower than posteriorly; lateral margin straight; occipital corner forms single convexity with posterior margin. Clypeus

wider than long; anterior margin straight, with series of coarse setae, medial one longest; medially forming broad and low, weak longitudinal carina. Subgenal sulcus in frontal view angular. Frons continuous with frontal lobe. Frontal lobe anteriorly as wide as antennal condyle. Medial frontal suture vestigial. Frontal carinae curved and converging posteriorly, almost parallel. Eye convex; surpassing lateral margin.

Mandible. Outer margin straight at base in frontal view, gradually becoming convex at apex; masticatory margin with three or four teeth; apical tooth about two times bigger than

subapical teeth; masticatory teeth gradually decreasing in size.

Antenna. Scape surpassing occipital corner, variable in length (SI 94.84–103.44); basal portion slightly curved; apical portion wider than basal. Pedicel curved at base. Flagellomeres gradually increase in length and width apically; apical flagellomere about two and a half times longer than the anterior.

Mesosoma. Pronotum rounded to marginate; wider than long in dorsal view with rounded lateral margin. Propleuron flat in ventral view. Mesonotum convex and not marginate, continuous with mesopleuron and notopropodeal sulcus; wider than long in dorsal view, dorsal margin higher anteriorly in lateral view. Mesopleuron marginate ventrally by carina. Mesometapleural suture absent, meso and metapleuron continuous. Notopropodeal sulcus as long as propodeum in dorsal view. Metathoracic spiracle globular. Metapleural-propodeal suture absent, metapleuron continuous to lateral face of propodeum. Bulla of metapleural gland visible; metapleuron posteriorly forming rounded lobe in lateral view. Propodeum not marginate; longer than wide in dorsal view, laterally compressed, dorsal face forming longitudinal blunt keel; dorsal and posterior margins forming single convexity in lateral view. Propodeal spiracle flat; opening circular and directed posteriorly.

Metasoma. Petiolar node with anterior and lateral margins forming single convexity in dorsal view; dorsal face marginate posteriorly, posterior margin straight; subquadrate in lateral view, anterior and dorsal margins meeting in blunt angle; dorsal and posterior margins meeting in straight angle; posterior margin straight. Petiolar spiracle opening circular. Sternum slightly convex becoming straight posteriorly. First gastral tergum with anterior and dorsal margins in lateral view meeting in blunt angle, shorter than second terga.

Color. Body and legs dark brown. Mandible, antenna and tarsi yellowish-brown, scape slightly darker.

Sculpturing. Body imbricate with piliferous punctures; clypeal imbrications weaker than vertex; meso-, metapleural and propodeal imbrications vary from fine to coarse. Mandible dorsal surface smooth and shining with piliferous punctures. Pygidium cataphracted (Fig. 13c and d; Keller, pers. comm.).

Pilosity and pubescence. Thin appressed and relatively short hairs present throughout body. Dorsal surface of mesonotum and metanotum with long suberect branched hairs, branches as long as hair width (Fig. 13a and b). Scape with dense appressed pubescence and short erect hairs on apex.

Comments

Amongst the *Camponotus* of the *dimorphus*-group, *C. cameloides* is unique due to the relatively wide notopropodeal sulcus and the dorsal face of propodeum shorter than the

mesonotum. The imbricate sculpturing and petiolar node shape are shared with other species, but the mesosoma shape is enough to recognize it. The imbricate sculpturing on the frontal area and mesosoma varies from weak to coarse. The number of suberect setae on the posterior portion of the head and dorsal face of the mesosoma also varies.

Branched pilosity is an interesting feature of *C. cameloides*, varying in size and number of branches in the body of the specimens. Branched pilosity are known in larvae of Formicinae and Myrmicinae in general (Wheeler G and Wheeler J 1953; Hölldobler and Wilson 1986; Fox et al. 2007; Ulysséa and Brandão 2021). In the *Camponotini* larvae, it is less variable (Wheeler G and Wheeler J 1953). In workers of *Hylomyrma* Forel 1912, as shown in detail by Ulysséa and Brandão (2021), this type of pilosity has a wide range of morphologies. This feature remains to be further investigated comparatively within *Camponotus*.

Based on the available data on the labels, *C. cameloides* appears to be a species with arboreal habits, as most samples were collected using methodologies such as arboreal pitfall traps or beating in vegetation. Only a single specimen was collected on the ground through epigeic pitfall trap, suggesting this species may occasionally forage in the epigeic stratum.

Through our search in collections for this species and the examined samples, *C. cameloides* seems to have a restricted distribution to the Cerrado in *Campos Rupestres* areas (Fig. 14), besides being a species collected infrequently, given the low number of occurrences during inventories conducted in Brasília (n = 1) and in the Serra do Cipó (n = 3). Additionally, most known records for this species come from conservation areas (i.e., National Park and an Environmental Protection Area), reducing threats to the species. However, in recent years, wildfires in the region have been recorded with greater intensity, representing a concern, particularly considering the vulnerability of ants to anthropogenic actions (Kuchenbecker et al. 2023).

Additional material examined

5 minor workers. BRAZIL: Distrito Federal, Brasília, xii.2017, 15° 46' 32.31" S 47° 56' 46.55" W pitfall [epigeic], Costa, M. B. T. col. (MPEG, 1 worker, MPEG03034550)/ APA Gama Cabeça de Veado, ii-iii.2000, Mireille, P. col., (CELC, 1 worker, UFV-LABEL-COL-010116). Minas Gerais, Serra do Cipó, vii.2011–1. iii.2015, 960 m, 19°22'3S, 43°37'1W, Cód. C4A254.7, Ribeiro, L. [col.], (DZUP, 1 worker, DZUP591921)/ [same data], Cód. C1781A12 (DZUP, 1 worker, DZUP591923)/ Capão dos Palmitos, -19.369074 -43.616814, vii.2014-iii.2015, Fieto, L. col., [arboreal pitfall] (MPEG, 1 worker, UFV-LABELCOL-009230).

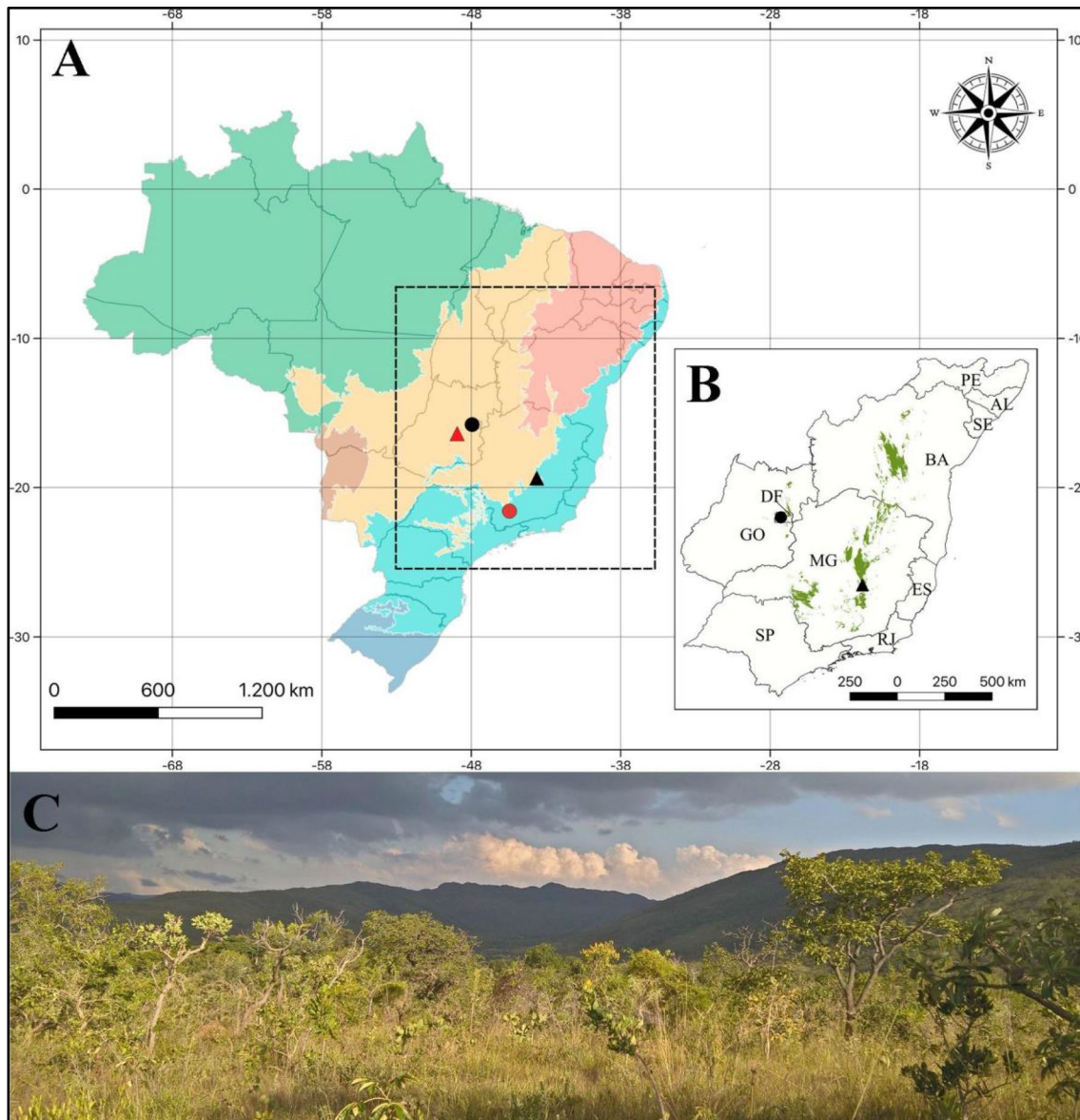


Fig. 14 Distribution maps. **A**, distribution of *C. cameloides* sp. nov. (black markers) and *C. hyalus* sp. nov. (red markers). Triangles represent type-localities; colors represent Brazilian biomes: Amazônia (green), Cerrado (yellow), Pantanal (brown), Mata Atlântica (light blue), Caatinga (red), Pampa (dark blue). **B**, distribution of *C. cameloides* sp. nov. in *Campos Rupestres* (green areas). **C**, image representing the type-locality of *C. cameloides* sp. nov. (by Scarlett Epifânio)

Camponotus hyalus França, Cubillos & Lattke.
(Figs. 5a and 15).

-45.438167] IX-[19]61, M. Alvarenga [col.], (MZSP, MZSP0106987).

Type specimens

Holotype worker. BRAZIL: GO [Goiás]: Anápolis, Campus UEG [Universidade Estadual de Goiás] [-16.381694 -48.946056]—Mata Mesófila, 15.ix.2005, #5 (Lozi, Luciano col.), Coll. Diniz, (DZUP, DZUP591920). *Paratype worker*. BRAZIL: MG [Minas Gerais]: Varginha, [-21.579944

Etymology

The specific epithet *hyalus* (from the Latin word *hyalus* = glass) is a Latin singular and masculine in nominative case and refers to the smooth and shining integument of workers, which resembles glass.

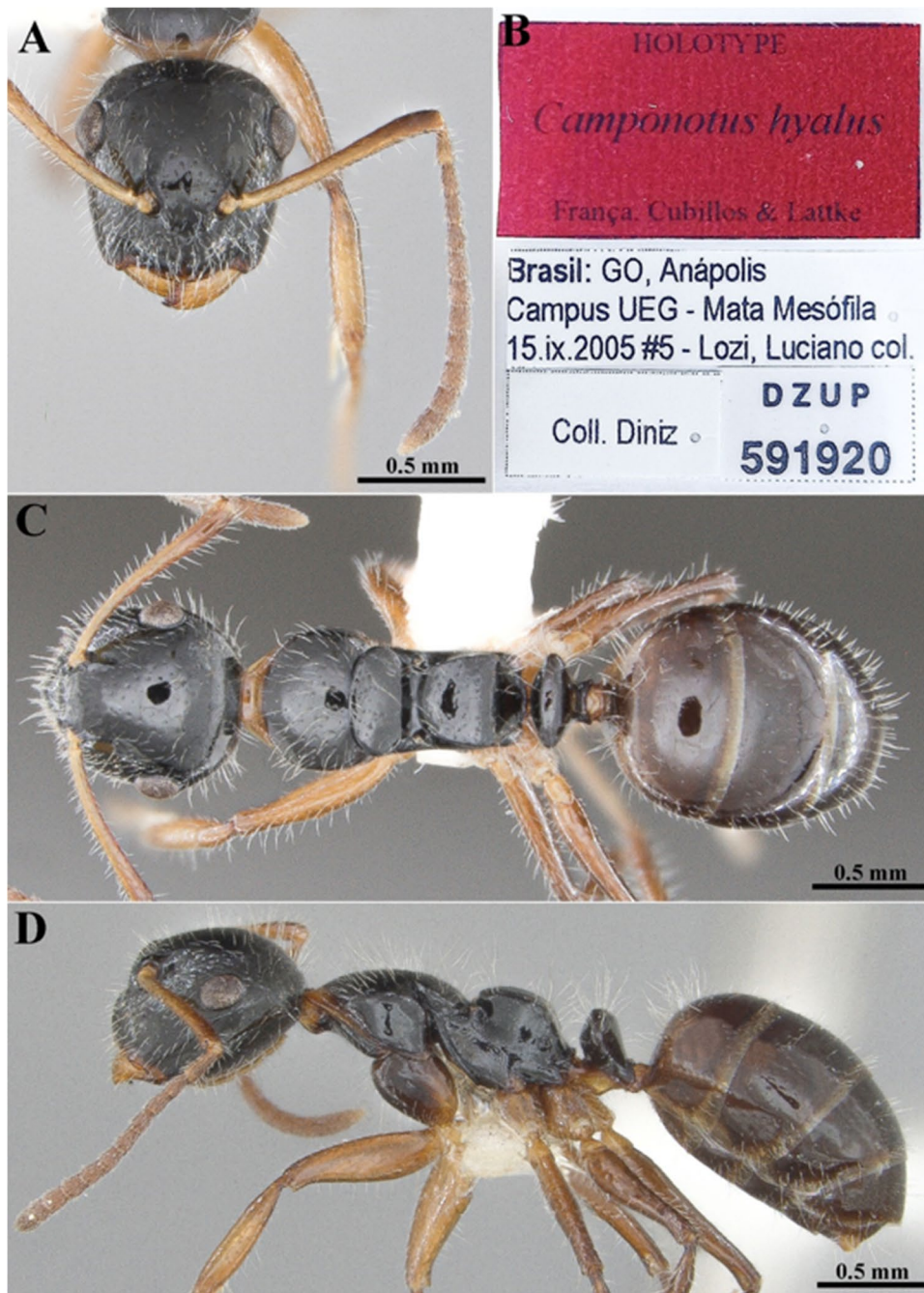


Fig. 15 *Camponotus hyalus* holotype. **A**, head in full-face view; **B**, specimen labels; **C**, full dorsal view; **D**, full lateral view

Diagnosis

Smooth and shining integument. Notopropodeal sulcus wider than metanotal spiracle. Metanotal spiracle tuberculiform. Propodeum sharply marginated; dorsal margin straight in lateral view. Petiolar node trapezoidal in lateral view, anterior and dorsal margins form blunt obtuse angle; dorsal margin highest posteriorly forming convexity with posterior margin.

Minor worker

Measurements and Indexes

Holotype: CL 0.28; CW 0.40; EL 0.22; LHL 0.80; HMdL 0.77; HL 1.05; HW 0.77; GL 1.33; ML 0.37; SL 0.90; PtH 0.40; PtL 0.18; PpH 0.25; PpL 0.43; WL 1.21; TL 4.14. CI 73.33; ClyI 142.85; PpI 172; SI 116.88.

Paratype CL 0.28; CW 0.43; EL 0.22; LHL 0.80; HMdL 0.71; HL 0.99; HW 0.84; GL 1.52; ML 0.37; SL 0.96; PtH 0.46; PtL 0.22; PpH 0.34; PpL 0.46; WL 1.24; TL 4.34. CI 84.84; ClyI 153.57; PpI 135.29; SI 114.28.

Head. Sub-trapezoid in frontal view, anterior portion narrower than posterior; lateral margin straight; occipital corner forming single convexity with posterior margin. Clypeus wider than long; anterior margin convex, medially with a series of thin setae; medially forming broad and low, weak longitudinal carina. Subgenal sulcus rounded in frontal view. Frons separated from frontal lobe by weak suture. Frontal lobe anteriorly as wide as antennal condyle. Medial frontal suture vestigial. Frontal carinae parallel posteriorly. Eye convex; surpassing lateral margin.

Mandible. Outer margin convex in frontal view; masticatory margin with five teeth gradually increasing in size apical.

Antenna. Scape surpassing occipital corners, variable in length (SI 114.28–116.88); basal portion slightly curved; apical portion wider than basal. Pedicel curved at base. Flagellomeres gradually decrease in length and increase in width apically; apical flagellomere two times longer than the anterior.

Mesosoma. Pronotum bluntly marginate; wider than long in dorsal view with rounded lateral margin. Propleuron flat in ventral view. Mesonotum bluntly marginate, continuous with notopropodeal sulcus posteriorly; wider than long in dorsal view, dorsal margin anteriorly higher in lateral view. Mesopleuron marginate ventrally by thick lamella. Meso-metapleural suture absent, meso and metapleuron continuous. Notopropodeal sulcus longer than metathoracic spiracle in dorsal view. Metathoracic spiracle shaped as tubercle. Metapleural-propodeal suture absent, metapleuron continuous to lateral face of propodeum. Bulla of metapleural gland visible; metapleural posteriorly forming rounded lobe in lateral view. Propodeum sharply marginate; subtrapezoidal in dorsal view, narrower anteriorly than posteriorly; dorsal margin straight in lateral view, forming blunt angle with posterior margin, both margins subequal in length. Propodeal spiracle globular; opening circular and directed posteriorly.

Metasoma. Petiolar node with dorsal face reduced and narrow in dorsal view; lateral margins convex. Anterior margin with one-third ventral portion vertical and the rest oblique, summit weakly convex, posterior margin slightly convex in lateral view. Petiolar spiracle opening circular. Sternum convex. First gastral tergum with anterior margin gradually forming dorsal margin in lateral view, shorter than second terga.

Color. Head black. Mandible yellowish-brown. Antenna yellowish-brown. Mesosoma black. Legs light-brown, except for dark-brown to almost black procoxa. Petiolar node

black; peduncle and sternum light-brown. Gaster dark-brown to almost black.

Sculpturing. Head, mandible dorsal surface, petiole and most of mesosoma smooth and shining with sparse piliferous punctures, inconspicuous imbrications on meso and metapleuron. Gastral terga with inconspicuous imbrications and sparse piliferous punctures.

Pilosity and pubescence. Thin and relatively short hairs present throughout body. Hairs on scape erect and relatively short, becoming longer apically. Long suberect to erect hairs present on dorsal surface of head, mesosoma and petiole; long hairs on gaster limited to anterior face of T1.

Comments

Camponotus hyalus is the only species of the *dimorphus*-group with the notopropodeal sulcus longer than the metanotal spiracle and the dorsal and lateral faces of propodeum, separated by sharp edges with dorsal margin in lateral view straight. These characteristics are shared with *Camponotus raphaelis* Forel 1899 and *Camponotus hippocrepis* Emery 1920, both from *Camponotus (Myrmocladoecus)* Wheeler, 1921. The propodeal lobes of *C. raphaelis* and *C. hippocrepis* vary in proportion but are always present in minor and major workers. The propodeum of *C. raphaelis* is longer than wide, while in *C. hyalus* it is as wide as long. The petiolar node is similar to that of *C. raphaelis* but the propodeum of *C. hyalus*, lacking lobes or spines, corresponds to the *Myrmobrachys dimorphus*-group. Considering all these characteristics, the status of *C. hyalus* as a valid species is corroborated. The pilosity of *C. hyalus* has a rough aspect, as in *C. cameloides*, and it is probably branched too. Due to the lack of additional material, we were not able to verify this under SEMt. *Camponotus hyalus* can be quickly differentiated from *C. scissus* by the smooth and shining meso and metapleuron, the notopropodeal sulcus longer than the metathoracic spiracle, the propodeum dorsum is wider than long, and the petiolar node not forming acute blunt angle; whereas *C. scissus*, has coarsely imbricate to costulate meso and metapleuron, the notopropodeal sulcus at most as long as the metathoracic spiracle, the propodeum dorsum is longer than wide, and the petiolar node forming acute blunt angle.

We found one specimen in DZUP from Panamá (DZUP591922) which likely represents a new species similar to *C. hyalus*. It also has smooth and shining tegument and tubercle-like metathoracic spiracles, but the propodeum is not marginate, resembling more the propodeum in *C. caracalla*. This specimen has a broken gaster and due to the lack of more specimens, we decided to not describe it.

Discussion

Camponotus is a taxonomically challenging genus due to the myriad of species and available names. Most of the species of *C.* (*Myrmobrachys*) have high-quality images of type specimens available online. It was possible to examine 15 type specimens from the 20 available names for the *dimorphus*-group (Tab. 1), due to the unavailable images of the type specimens of *C. abscisus*, *C. bajulus*, *C. propinquus baretoi*, *C. alfaroi* and *C. granulatus*. In this case, the images were enough to recognize diagnostic characters useful for the dichotomous key. In particular, for *C. abscisus*, it is necessary to locate the type specimen, considering that it is currently a valid species. In Bolton (2024), the status of the type depository is unknown. The type material of Roger is principally in DEIB (Deutsches Entomologisches Institut, Berlin, Germany), MNHN (Muséum Nationale d'Histoire Naturelle, Paris, France), MNHU (Museum für Naturkunde der Humboldt-Universität Berlin, Germany), and ZSBS (Zoologisches Sammlunge des Bayerischen Staates, München, Germany). We were not able to find the type of *C. abscisus* in the digital repositories of these collections.

The identification key for the Neotropical *Camponotus* subgenera (Mackay 2019) and the Colombian key for species and complexes (Mackay W and Mackay E 2019), allows the users to easily get to the subgenus *C.* (*Myrmobrachys*), despite lacking some of its constituent species and being extensive keys. Additionally, the lack of colored, high-quality images gives these keys extra difficulty, leading to misinterpretations of the characters. With better images and highlighted characters, we hope to reduce ambiguity for the users. Furthermore, by proposing a key only to a subset of the *C.* (*Myrmobrachys*) species (those of the *dimorphus*-group), we considerably reduce the size of the key, reducing the chances of users getting lost. According to Mackay (2019), major workers are essential for the species identification of *Camponotus*. In the *dimorphus*-group, though, we found enough diagnostic characters in the minor. As the minor workers are more frequent in collections, we chose to rule out major characters from the key and species diagnosis.

According to Mackay (Mackay 2019, Mackay W & Mackay E (2019)), the subgenus *C.* (*Myrmocladoecus*) would be a synonym of *C.* (*Myrmobrachys*), since the author includes in both keys *C.* (*Myrmocladoecus*) species among the *C.* (*Myrmobrachys*) species. The synonym was not published and then, *C.* (*Myrmocladoecus*) was kept as a valid subgenus. Considering the diagnostic features proposed by Emery (1925), we consider both subgenera as distinct. The only species that might be confused with *C.* (*Myrmocladoecus*) is *C. hyalus* since it is similar to *C. raphaelis* and *C. hippocrepis*. Even though, *C. hyalus*

does not have propodeal projections and the petiole node mucronate, which are diagnostic characters for *C.* (*Myrmobrachys*) (Emery 1925).

Revisions of local fauna, subgenera or groups of species can be beneficial to solve taxonomic issues of hugely diverse and difficult genera such as *Camponotus*. In the case of *C.* (*Myrmobrachys*), it is still necessary to review the *senex*-group, which is the richest in species and the one having a great number of specimens in the ant collections.

Conclusions

Amongst the *Camponotus* subgenera, the *C.* (*Myrmobrachys*) *dimorphus*-group is easily recognizable due to the discontinuous mesosoma. The availability of high-quality images of type specimens was an important factor that allowed this study. Notwithstanding, the status of *C. abscisus* and *C. elevatus* as valid species needs attention, and it is necessary to review more specimens, especially associated minor and major workers.

Even a hundred years later, the diagnosis for the *Camponotus* subgenera of Emery (1925) remains useful, but specific cases need attention and updated diagnosis are necessary. Identification keys are important to help myrmecologists recognize species, groups or subgenera and hence contribute to phylogenetics, ecology and natural history knowledge. We recommend taxonomic revisions for subgenera or species groups with relatively low numbers of species.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s13744-024-01193-y>.

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Nomenclature Zoobank Registration Numbers: *Camponotus cameloides* França, Cubillos, Chaul, Prado & Lattke. <http://zoobank.org/urn:lsid:zoobank.org:act:733FFAD6-041F-4FD8-B7F0-27F4D2EF-1CE8>. *Camponotus hyalus* França, Cubillos & Lattke. <http://zoobank.org/urn:lsid:zoobank.org:act:4AE9A47A-C802-405B-843E-B15C-44B7087A>.

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Declarations

Conflict of interest All the authors declare no conflict of interest.

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