European Journal of Taxonomy 1004: 190–210
https://doi.org/10.5852/ejt.2025.1004.2967

europeanjournaloftaxonomy.eu
ISSN 2118-9773
2025 ·Liu Z. & Polaszek A.

Received: 28 October 2024 • *Accepted: 23 April 2025* • *Published: 23 July 2025*

Topic editor: Tony Robillard • *Section editor: Gavin Broad* • *Desk editor: Eva-Maria Levermann*

Research article

urn:lsid:zoobank.org:pub:B1AD3B51-24D3-4D91-A9A4-D3FBE66FF0A6

The species of *Centistidea* Rohwer, 1914 (Hymenoptera: Braconidae: Miracinae) from Brazil

Zhen LIU [1,*] & Andrew POLASZEK [2,*]

[1] Zoology Key Laboratory of Hunan Higher Education, College of life and environmental sciences, Hunan University of Arts and Science, Changde 415000, China.
[2] Science: Research, Natural History Museum, Cromwell Road SW7 5BD, London, UK.

[*] Corresponding authors: qingniao8.27@163.com; a.polaszek@nhm.ac.uk

Abstract. Four new species of the subfamily Miracinae (Hymenoptera: Braconidae) are described from Brazil based on specimens in the Natural History Museum, UK: *Centistidea areolaris* sp. nov., *C. breviantennalis* sp. nov., *C. radialis* sp. nov., and *C. latisulca* sp. nov. New distribution records of *C. insularis* (Muesebeck, 1937) and *C. vertus* (Papp, 2013) from the Neotropical region are provided, together with an illustrated key to all species of *Centistidea* known in Brazil.

Keyword. Checklist, key, new taxa, Neotropical region.

Liu Z. & Polaszek A. 2025. The species of *Centistidea* Rohwer, 1914 (Hymenoptera: Braconidae: Miracinae) from Brazil. *European Journal of Taxonomy* 1004: 190–210. https://doi.org/10.5852/ejt.2025.1004.2967

Introduction

Of all the world's zoogeographical regions, the Neotropical region contains the greatest species diversity of the braconid subfamily Miracinae Viereck, 1918, based on publicly available DNA barcode records. 558 CO1 sequences in the BOLD database (https://boldsystems.org) are from Neotropical specimens, of a global total of 996 publicly available sequences. The Neotropical sequences fall into 139 BINs (Barcode Index Numbers; approximating to species), of a total of 263 global BINs. The actual number of described species, however, is greatest in the Oriental region (30) followed by the Neotropical region with 17 (Liu & Polaszek 2024a, 2024b).

Brues (1912) was the first to describe Miracinae from this area. Later, several authors (Muesebeck 1937; Marsh 1979; Papp 1993, 2013; Penteado-Dias 1999; Cauich-Kumul *et al.* 2014) described additional species as members of either *Mirax* Haliday, 1833 or *Centistidea* Rohwer, 1914. Papp (2013) made the biggest contribution to the study of Neotropical Miracinae by describing 11 new species, and providing a key to the 16 species (all treated by him in the subgenus *Centistidea* of *Mirax*). The relationships between these two genera have been discussed recently by Liu & Polaszek (2024a) who suggested that all described species from this region belong to the genus *Centistidea* which they treat as a genus, rather than a subgenus of *Mirax* (Liu & Polaszek 2024a, 2024b). They characterize the genus as possessing a

propodeum with a rather complete median longitudinal carina, with variable transverse sculpture laterally from the carina and the notauli more impressed anteriorly.

Perhaps surprisingly, only two species and no *COI* sequences have ever been reported from Brazil, the largest country in the Neotropical region. Nine species are known from its northwestern neighbour Colombia, and 507 published records of Miracinae in BOLD system are from Costa Rica. The miracine fauna of Brazil has clearly been little-studied.

During our ongoing project on worldwide Miracinae, we found four new species from the Neotropical region based on specimens from the Natural History Museum, London, UK.

Material and methods

Specimens studied are deposited in the Natural History Museum, London, UK (NHMUK). Descriptions and measurements were made using a stereo microscope (Zeiss® Stemi SV6). Photographs of the wasps were taken and processed using a digital camera (Zeiss AxioZoom or Hirox HRX-01 combined with Helicon Focus software The images were further processed using Adobe Photoshop® CS6. Morphological terms for body structures and measurements follow Slater-Baker *et al.* (2022) and Ranjith *et al.* (2023). The wing vein terminology follows the modified Comstock-Needham system (van Achterberg 1993).

Abbreviations for morphological terms

The terminology of the cuticular sculpture follows Harris (1979).

OD = ocellar diameter
OOL = ocular-ocellar line
POL = postocellar line
T1 = 1st tergite of metasoma
T2 = 2nd tergite of metasoma
T3 = 3rd tergite of metasoma

Results

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Family Braconidae Nees, 1811

Subfamily **Miracinae** Viereck, 1918

Checklist of Miracinae from Brazil

Centistidea areolaris sp. nov. [Brazil (Santa Catarina)]
Centistidea brasiliensis (Brues, 1912) [Brazil (Rio Grande do Norte); French Guiana]
Centistidea breviantennalis sp. nov. [Brazil (Santa Catarina)]
Centistidea insularis (Muesebeck, 1937) [**new to Brazil** (Paraná) **and Costa Rica**; Dominica, Guadeloupe, Puerto Rico]
Centistidea latisulca sp. nov. [Brazil (Santa Catarina); Belize, Costa Rica, Mexico, Trinidad]
Centistidea radialis sp. nov. [Brazil (Santa Catarina); Belize]
Centistidea striata Penteado-Dias, 1999 [Brazil (São Paulo)]
Centistidea vertus (Papp, 2013) [**new to Brazil** (Santa Catarina); Colombia]

Taxonomy

Key to species of genus *Centistidea* Rohwer, 1914 from Brazil

1. Notauli extending to two-thirds of mesoscutum and meeting each other posteriorly; median line of face almost carinate ..... ***C. brasiliensis*** (Brues, 1912)
– Notauli extending, at most, to half of mesoscutum and not meeting posteriorly (e.g., Fig. 3e); face not carinate medially (e.g., Fig. 3c) 2

2. Scutellar sulcus distinctly crenulate (e.g., Fig. 3e) 3
– Scutellar sulcus smooth (e.g., Fig. 5e) 5

3. Propodeum with carinulate-areolate elements (Fig. 6b); head less broad, 1.7× as wide as long in dorsal view (Fig. 6e); mesosoma black at least dorso-laterally (Fig. 6b) ..... ***C. vertus*** (Papp, 2013)
– Propodeum without carinulate-areolate elements (e.g., Fig. 4j); head broader, at least 1.8× as wide as long in dorsal view (e.g., Fig. 4b); mesosoma yellow to brown (e.g., Fig. 4e) 4

4. Propodeum 1.8× as wide as its mid length (Fig. 4j); face transverse, 2.0× as wide as high (Fig. 4c); T3 weakly longitudinally striate (Fig. 4k) ..... ***C. latisulca*** sp. nov.
– Propodeum 1.4× as wide as its mid length (Fig. 3h); face 1.4× as wide as high (Fig. 3c); T3 nearly polished (Fig. 3i) ..... ***C. insularis*** (Muesebeck, 1937)

5. T1 strongly constricted anteriorly (e.g., Fig. 5k); T2 reduced to very narrow longitudinal strip basally while abruptly widened apically (e.g., Fig. 5l) 6
– T1 indistinctly constricted anteriorly (e.g., Fig. 1i); T2 gradually widening from basal to apical part (e.g., Fig. 1l) 7

6. Fore wing vein r almost completely absent; occiput striate; scutellar hind depressions nearly touching each other ..... ***C. striata*** Penteado-Dias, 1999
– Fore wing vein r distinctly present (Fig. 5g); occiput at most weakly rugulose (Fig. 5b); scutellar hind depressions distinctly separated, interspace at least half length of minor axis of a depression (Fig. 5h) ..... ***C. radialis*** sp. nov.

7. Propodeum with areola (Fig. 1e, h); 1-CU1 of fore wing slightly longer than 2-CU1 (1.1×) (Fig. 1g); ovipositor sheath short, about half length of hind basitarsus (Fig. 1g, k) ..... ***C. areolaris*** sp. nov.
– Propodeum without areola (Fig. 2i); 1-CU1 of fore wing distinctly shorter than 2-CU1 (0.7×) (Fig. 2g); ovipositor sheath 1.5× as long as hind basitarsus (Fig. 2a, j) ..... ***C. breviantennalis*** sp. nov.

Genus *Centistidea* Rohwer, 1914

Centistidea areolaris sp. nov.
urn:lsid:zoobank.org:act:6D0C3411-3C3D-4639-9B8C-229F7779E394
Fig. 1

Diagnosis

Body length 1.7 mm, light red-brown, except apical part of propodeum and T1–T4 black-brown (Fig. 1a); head 2.0× as wide as long dorsally; eyes 2.4× as long as temple in dorsal view; POL:OD:OOL = 1.5:1.0:2.5 (Fig. 1b); antenna (Fig. 1d) 1.2× as long as body length, with penultimate flagellomere 2.8× as long as wide; notauli weakly depressed at anterior ⅓; scutellar sulcus not crenulate; scutellar hind

depressions medium-sized and oblong, with interspace over half of its minor axis (Fig. 1e); propodeum (Fig. 1h) with median longitudinal carinae attached with a diamond-shaped areola (this can be very difficult to see, requiring particular lighting); fore wing with (Fig. 1g) vein 1-R1 triangular, 0.2 of pterostigma length; T1 (Fig. 1i) weakly sclerotized, 1.9× as long as its subapical maximum width; T2 (Fig. 1l) 1.7× as wide as median length, longitudinally striate laterally; T3 0.8× as long as T2, weakly longitudinally striate; ovipositor sheath (Fig. 1k) about half length of hind basitarsus.

Etymology

The specific name '*areolaris*' derives from the Latin, referring to its propodeum with areola in addition to the median longitudinal carina.

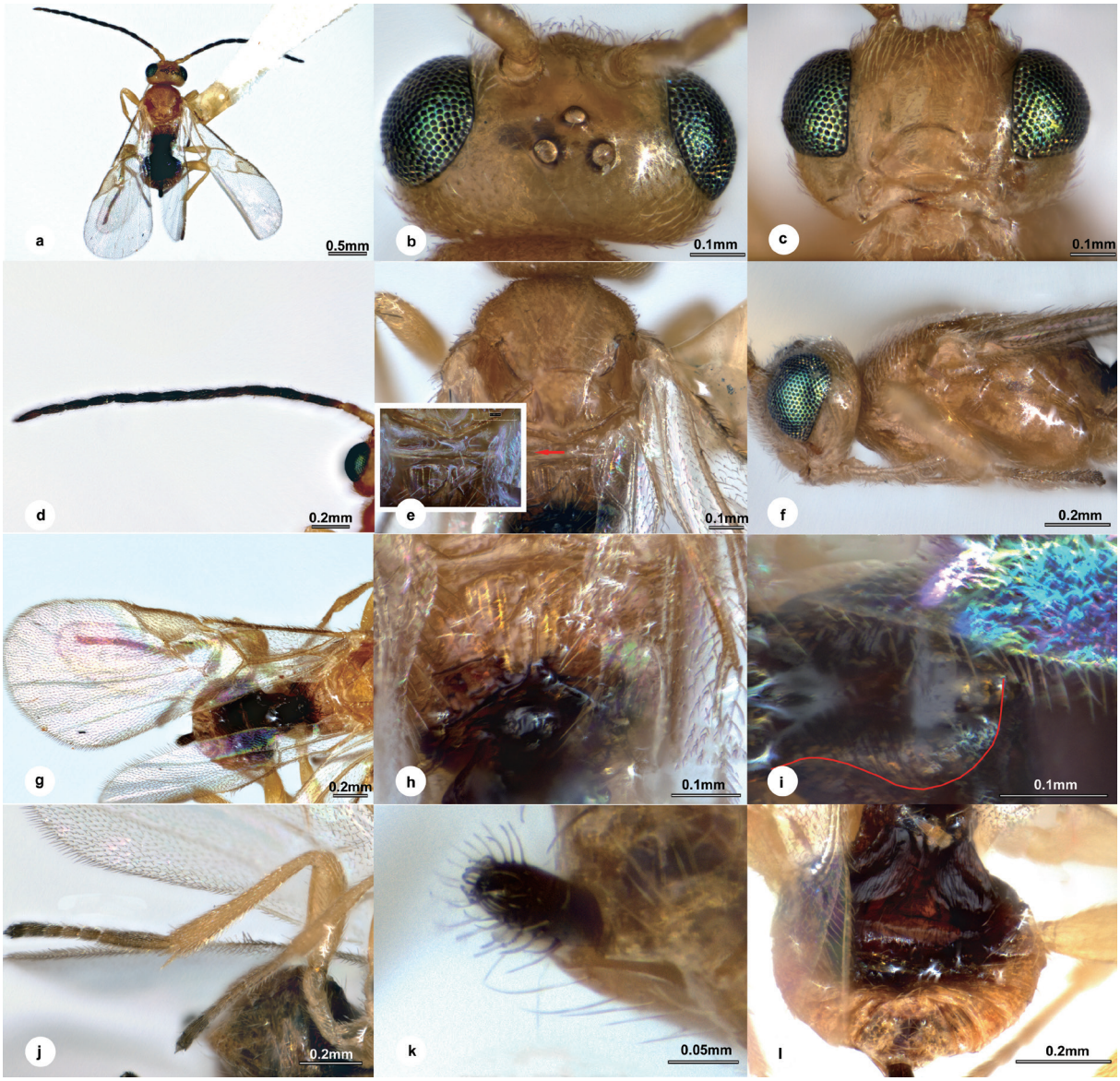

Fig. 1. *Centistidea areolaris* sp. nov., ♀, holotype (NHMUK010639567). **a**. Habitus, dorsal view. **b**. Head, dorsal view. **c**. Head, frontal view. **d**. Antenna. **e**. Mesoscutum and scutellum, dorsal view. **f**. Mesopleuron. **g**. Fore wing and hind wing. **h**. Propodeum. **i**. T1. **j**. Hind leg. **k**. Ovipositor sheath. **l**. T2 and following terga, dorsal view.

Type material

Holotype

BRAZIL • ♀; Nova Teutonia; 27.1833° S, 52.3833° W; 4 Oct. 1938; F. Plaumann leg.; B.M.1938-682; NHMUK010639567; NHMUK.

Description

Female

Measurements. Body length 1.7 mm, fore wing length 2.1 mm (Fig. 1a).

Head. 2.0 × as wide as long dorsally, 1.2 × as wide as mesoscutum. Eyes 2.4 × as long as temple in dorsal view. Temple smooth, with dense setae, slightly and roundly constricted behind eyes in dorsal view (Fig. 1b). Ocelli small, distance between fore and hind ocellus 1.1 × as long as minor axis of a hind ocellus, POL:OD:OOL = 1.5:1.0:2.5. Frons flat and polished. Vertex between eye and hind ocellus a little shiny and smooth with small, sparse setose punctures. Occiput shallowly longitudinally striate at bottom. Face (Fig. 1c) nearly smooth except small, dense setose punctures, slightly convex medially, rather transverse, 2.0 × as wide as high. Clypeus 2.2 × as wide as median length, nearly polished except few setae laterally. Length of malar space 0.7 × as long as basal width of mandible. Antenna (Fig. 1d) 1.2 × as long as body length, with scape, pedicel and 1st, 2nd, penultimate and ultimate flagellomeres 2.0, 1.9, 4.4, 3.3, 2.8 and 3.3 × as long as wide, 1st 1.3 × as long as 2nd, flagellomeres gradually shortening to penultimate one.

Mesosoma. Length:width:height = 1.6:1.0:1.0. Mesoscutum (Fig. 1e) a little shiny with sparser small punctures on anterior half, shallowly punctate on apical half, notauli weakly depressed at anterior ⅓. Scutellar sulcus slightly curved, narrow and shallowly concave, not crenulate. Scutellum shiny, polished, hind depressions medium-sized and oblong, with interspace over half of its minor axis. Propodeum (Fig. 1h) shiny, median longitudinal carinae split to transverse carinae near apical extremity, attached to diamond-shaped areola, elsewhere polished. Mesopleuron (Fig. 1f) highly polished, smooth.

Legs. Hind femur 3.1 × as long as its widest part. Length of hind femur:tibia:basitarsus = 1.6:2.4:1.0. Hind basitarsus 0.8 as long as tarsomeres 2–5 combined (Fig. 1j).

Wings. Fore wing (Fig. 1g): pterostigma large, 2.3 as long as its widest part, vein 1-R1 triangular, 0.2 of pterostigma length; vein r distinct, r:2-SR:2-M = 1.0:7.7:2.7, 1-SR:1-M = 1.0:3.8, 1-CU1 indistinctly longer than 2-CU1; first discal cell of fore wing indistinctly wider than high. Hind wing (Fig. 1g): vein M+CU:1-M:r-m = 3.2:2.8:1.0.

Metasoma. 0.8 × as long as mesosoma. T1 (Fig. 1i) smooth and polished, weakly sclerotized, 1.9 × as long as its subapical maximum width, slightly narrowed anterio-medially. T2 (Fig. 1l) 1.7 × as wide as median length, longitudinally striate laterally. T3 0.8 × as long as T2, weakly longitudinally striate. Hypopygium not reaching apex of metasoma. Ovipositor sheath (Fig. 1k) short, about half length of hind basitarsus, with setae of same length and denser apically.

Color. Light red-brown, except apical part of propodeum and T1–T4 black-brown (Fig. 1a). Eyes with green metallic reflection. Palpi and spurs pale yellow. Antenna black-brown except scape and pedicel yellow-brown. Legs all yellow except tarsi yellow-brown. Wing membrane hyaline, pterostigma pale brown, veins C+SC+R, r, 2-SR, 1-SR, 1-M, M+CU, 1-CU1 and 2-CU2 brown, other veins pale brown.

Male

Unknown.

Host

Unknown.

Distribution

Brazil.

Remarks

This species is similar to *C. linguaris* (Papp, 2013) but differs in the following characters: antenna 1.2× as long as body length (somewhat shorter than body length in *C. linguaris*); ovipositor sheath about half length of basitarsomere (longer, as long as tarsomeres 1–3 of hind tarsus in *C. linguaris*); and propodeum with areola (absent in *C. linguaris*).

Centistidea brasiliensis (Brues, 1912)

Mirax brasiliensis Brues, 1912: 205; holotype in Museum of Comparative Zoology, Harvard University, Cambridge, USA (not examined).

Mirax brasiliensis – Shenefelt 1973: 677. — Braet 2006: 167.
Mirax (*Centistidea*) *brasiliensis* – Papp 2013: 124, figs 14–21.
Centistidea brasiliensis – Yu *et al.* 2016.

Diagnosis

Female

Body length 2.2 mm; head and mesosoma pale honey-yellow, metasoma somewhat lighter; head twice as wide as long dorsally; median line of face almost carinate; antenna as long as body length, with flagellar joints beyond first not less than 2.5× as long as wide; malar space very short, with furrow; notauli evenly deep, distinctly crenulate and extending to two-thirds of mesoscutum; scutellar sulcus curved, deep, crenulate; propodeum irregularly areolate with a median carina that bifurcates behind, a straight transverse carina behind, and a curved carina on each side at the base which marks off a large square space at each lateral angle; wing with broad pterostigma, marginal cell entirely wanting; submedian cell longer than median by the length of the transverse median vein; T2 twice as broad as long, longitudinally striate; ovipositor as long as head height, its sheath broad, pilose, piceous with pale yellow base (following Brues 1912 and Papp 2013).

Host

Unknown.

Distribution

Brazil, French Guiana.

Remarks

Based on Brues (1912) and Papp (2013), this species is peculiar among its congeners for its distinctly longer and deeper notauli on the mesoscutum.

Centistidea breviantennalis sp. nov.
urn:lsid:zoobank.org:act:BD65A330-E372-46E1-A4FD-97DD2E7B7364
Fig. 2

Diagnosis

Body length 2.2 mm, red-brown (Fig. 2a); eyes 1.8 × as long as temple dorsally (Fig. 2b); POL:OD:OOL = 1.5:1.0:3.0; penultimate flagellomeres 2.0 × as long as wide; 1st flagellomere 1.4 × as long as 2nd (Fig. 2d); mesoscutum (Fig. 2e) nearly polished on apical half, notauli weakly depressed at anterior ⅓; scutellar sulcus smooth; scutellar hind depressions large and oval, nearly touching each other; propodeum (Fig. 2i) with median longitudinal carinae reaching apical margin, several transverse carinae regularly branching from median carinae; fore wing (Fig. 2g) with vein 1-R1 triangular, 0.3 × as long as pterostigma; T1 (Fig. 2k) indistinctly narrowed antero-medially; T2 hardly separate from lateral area, 0.9 × as wide as median length, weakly striate laterally; T3 0.9 × as long as T2, hardly longitudinally striate; ovipositor sheath (Fig. 2a, j) 1.5 × as long as hind basitarsus.

Etymology

The specific name '*breviantennalis*' refers to its distinctly short antenna.

Type material

Holotype

BRAZIL • ♀; Nova Teutonia; 27.1833° S, 52.3833° W; 8 Aug. 1938; F. Plaumann leg.; B.M.1938-682; NHMUK010639581; NHMUK.

Paratype

BRAZIL • 1 ♂; same data as for holotype; 15 Sep. 1938; B.M.1938-682; NHMUK010639562; NHMUK.

Description

Female

Measurements. Body length 2.2 mm, fore wing length 2.4 mm (Fig. 2a).

Head. 2.0 × as wide as long dorsally, 1.3 × as wide as mesoscutum. Eyes 1.8 × as long as temple in dorsal view. Temple smooth, with dense setae, slightly and roundly constricted behind eyes in dorsal view (Fig. 2b). Ocelli small, distance between fore and hind ocellus 1.3 × as long as minor axis of a hind ocellus, POL:OD:OOL = 1.5:1.0:3.0. Frons flat and polished. Vertex between eye and hind ocellus a little shiny and smooth with small, sparse setose punctures. Face (Fig. 2c) nearly smooth except small, dense setose punctures, slightly convex medially, 1.6 × as wide as high. Clypeus 2.0 × as wide as median length, nearly polished except few setae laterally. Length of malar space 0.8 × as long as basal width of mandible. Antenna (Fig. 2d) 0.7 × as long as body length, with scape, pedicel and 1st, 2nd, penultimate and ultimate flagellomeres 1.9, 1.5, 5.1, 3.7, 2.0 and 2.5 × as long as wide, 1st 1.4 × as long as 2nd, flagellomeres gradually shortening to penultimate one.

Mesosoma. Length:width:height = 1.4:1.0:1.2. Mesoscutum (Fig. 2e) less shiny with sparser small punctures on anterior half, nearly polished on apical half, notauli weakly depressed at anterior ⅓. Scutellar sulcus curved, narrow and concave, not crenulate. Scutellum a little shiny, polished, hind depressions large and oval, nearly touching each other. Propodeum (Fig. 2i) not shiny, with median longitudinal carinae reaching apical margin, several transverse carinae regularly emitted from median carinae, elsewhere polished. Mesopleuron (Fig. 2f) highly polished, smooth.

Legs. Hind femur 3.0 × as long as its widest part. Length of hind femur:tibia:basitarsus = 1.9:3.0:1.0. Hind basitarsus 0.7 × as long as tarsomeres 2–5 combined (Fig. 2h).

Wings. Fore wing (Fig. 2g): pterostigma relatively large, 2.9× as long as its widest part, vein 1-R1 triangular, 0.3 of pterostigma length; vein r indistinct, r:2-SR:2-M = 1.0:8.7:2.2, 1-SR:1-M = 1.0:3.1, 1-CU1:2-CU1 =1.0:1.5; first discal cell of fore wing 1.3× as wide as high. Hind wing (Fig. 2h): vein M+CU:1-M:r-m = 2.0:2.1:1.0.

Metasoma. Indistinctly (1.1×) longer than mesosoma. T1 (Fig. 2k) smooth, weakly sclerotized, indistinctly narrowed antero-medially, spoon-shaped (strongly attenuated to apex at apical third) apically, 2.3× as long as its subapical maximum width. T2 weakly sclerotized, 0.9× as wide as median length, weakly striate laterally. T3 0.9× as long as T2, hardly longitudinally striate. Hypopygium not reaching apex of metasoma. Ovipositor sheath (Fig. 2a, j) relatively long, 1.5× as long as hind basitarsus, with setae denser apically.

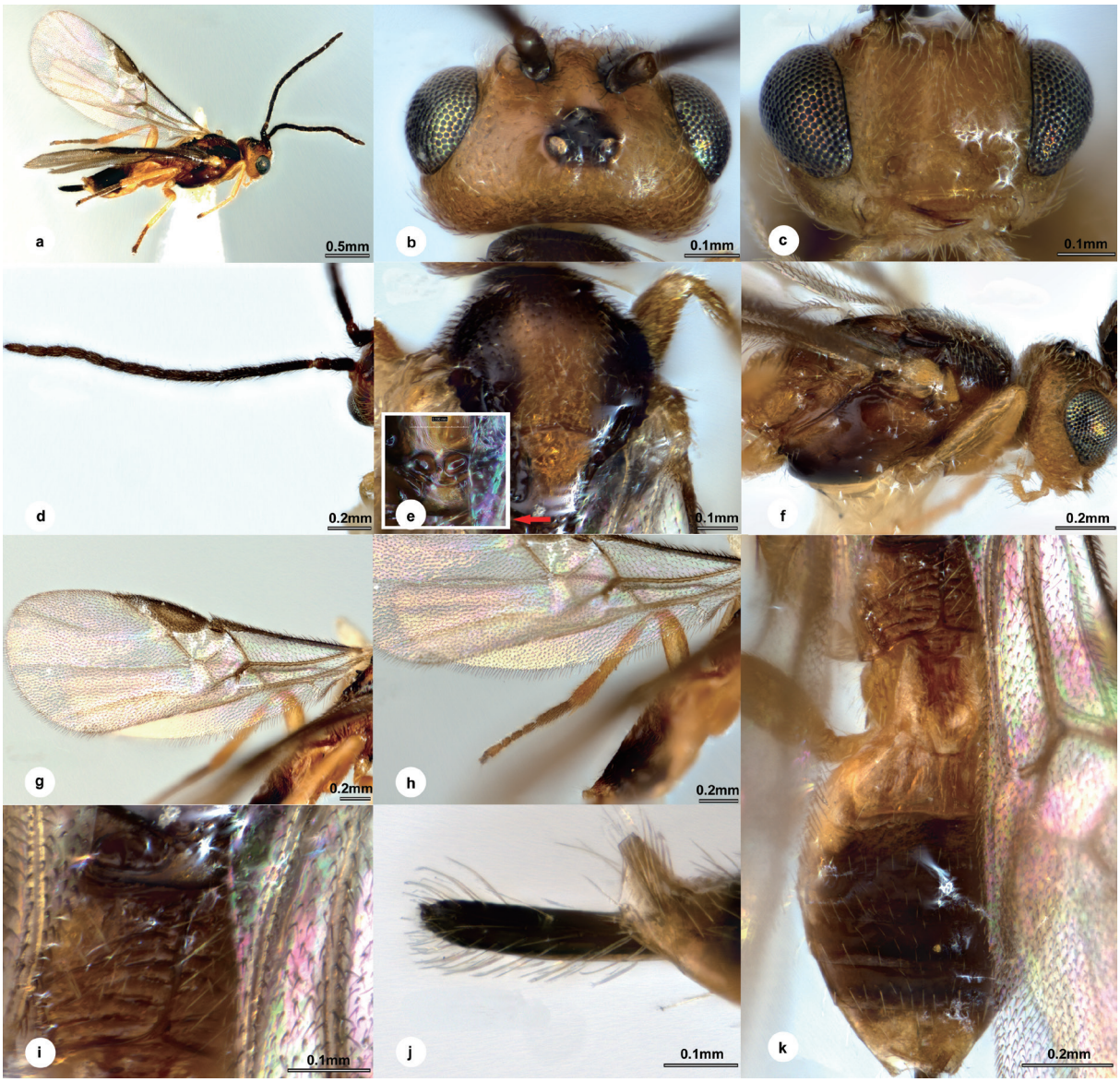

Fig. 2. *Centistidea breviantennalis* sp. nov., ♀, holotype (NHMUK010639581). **a**. Habitus, lateral view. **b**. Head, dorsal view. **c**. Head, frontal view. **d**. Antenna. **e**. Mesoscutum and scutellum, dorsal view. **f**. Mesopleuron. **g**. Fore wing. **h**. Hind wing and hind leg. **i**. Propodeum. **j**. Ovipositor sheath. **k**. Metasoma, dorsal view.

Color. Red-brown (Fig. 2a), except lateral parts of mesoscutum and scutellum and T3–T6 darker to black-brown. Eyes with green metallic reflection. Palpi and spurs yellow-brown. Antenna dark to black-brown. Legs all orange except tarsi yellow-brown. Wing membrane hyaline, pterostigma dark brown with pale opaque apex, veins C+SC+R, 2-SR, 1-SR, 1-M, M+CU, 1-CU1 and 2-CU2 darker brown, other veins yellow-brown.

Male

Similar to female except body slimmer with longer antenna, penultimate flagellomere nearly 3 × as long as wide and T3 weakly longitudinally striate.

Host

Unknown.

Distribution

Brazil.

Remarks

This species is similar to *C. carinatus* (Papp, 2013) having the propodeum finely rugulose with some transverse carinae along median longitudinal carina but differs in the following characters: antenna distinctly shorter (0.7 ×) than body length (somewhat longer than body length in *C. carinatus*); ovipositor sheath 1.5 × as long as hind basitarsus (somewhat shorter than hind basitarsus in *C. carinatus*); and T2 weakly sclerotized (T2 strongly sclerotized, obvious linear-shaped anteriorly in *C. carinatus*).

Centistidea insularis (Muesebeck, 1937)
Fig. 3

Mirax insularis Muesebeck, 1937: 139; holotype in U.S. National Museum of Natural History, Smithsonian Institute, USA (USNM) (holotype images examined on the website of USNM; paratypes examined).

Mirax insularis – Shenefelt 1973: 677. — Papp 2013: 108, figs 45–54.
Centistidea insularis – Yu *et al.* 2016.

Diagnosis

Body length 1.5 mm; yellow or yellow-brown with dark brown or piceous area (Fig. 3a); temple rounded (Fig. 3b); OOL about as long as one side of ocellar triangle; antenna (Fig. 3d) about the length of body, 1st flagellomere conspicuously longer than 2nd; mesosoma slightly wider than high, mesoscutum, scutellum, and pleura smooth (Fig. 3e–f); notauli distinctly impressed on more than anterior third of mesoscutum; scutellar sulcus deep, minutely foveolate (Fig. 3e); propodeum (Fig. 3h) with a complete median longitudinal carina and a few irregular transverse on either side of this; sclerotized plate of T1 very narrow (Fig. 3l); plate of T2 reduced to a very narrow longitudinal strip on basal half, strongly widened apically (Fig. 3i); ovipositor sheath shorter than hind basitarsus (following Muesebeck 1937).

Type material

Paratypes

GUADELOUPE • 1 ♀; "*Mirax insularis* ♀ Mues. Det. Muesebeck // W.I. July 36 / F. Sein Jr. // Paratype No 52019, U.S.N.M // lot No. 36-26032 // Pres by Imp.Inst.Ent.Brit.Mus.1937.455 // reared from coffee leaf miner"; Jul. 1936; NHMUK010639526; NHMUK • 3 ♂♂; same data as for preceding; NHMUK010639492, NHMUK010639494, NHMUK010639497; NHMUK.

Other material examined

BRAZIL • 1 ♂; Londrina; Feb. 1992; A. Menezes Jr. leg.; ex *Leucoptera coffeella* pupa; NHMUK010639535; NHMUK.

COSTA RICA • 1 ♀; "Guanacaste Pv Sta. Rose NP Hacienda-1-O"; Janzen and Gauld leg.; 1 Jun.–22 Jul. 1985; NHMUK010639517; NHMUK.

DOMINICA • 1 ♀; "Ridgefield // Nov. 1968 // FD Bennett leg. // No. 644 (C I E Coll., No.19575) // Pres by Com.Inst.Ent.Brit.Mus.1964-2 // det. Muesebeck, 1937"; NHMUK010639493; NHMUK • 1 ♂; same data as for preceding; No. 645; NHMUK010639512; NHMUK.

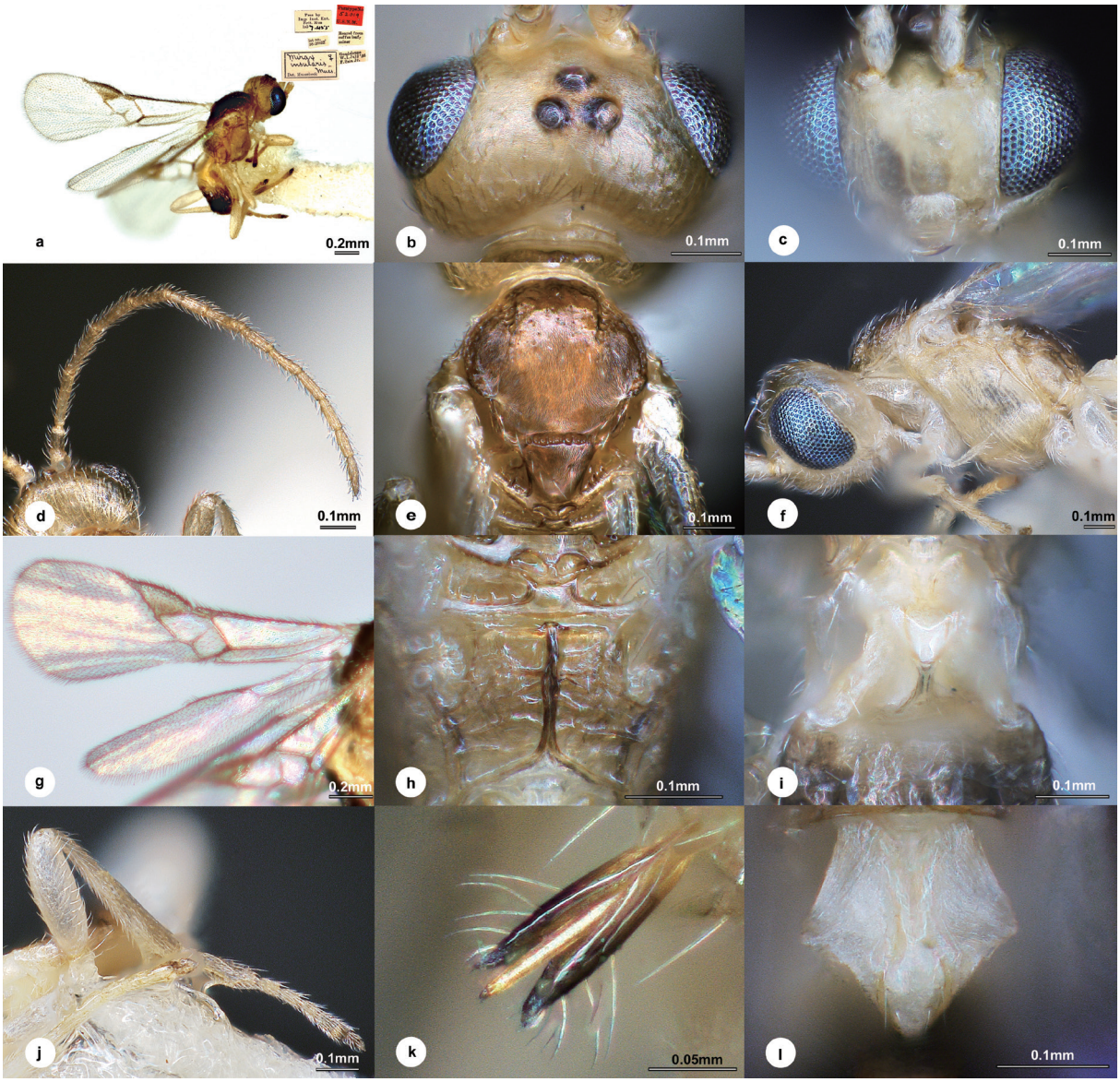

Fig. 3. *Centistidea insularis* (Muesebeck, 1937), ♀, paratype (NHMUK010639526). **a**. Habitus, lateral view and type labels. **b**. Head, dorsal view. **c**. Head, frontal view. **d**. Antenna. **e**. Mesoscutum and scutellum, dorsal view. **f**. Mesopleuron. **g**. Wings. **h**. Propodeum. **i**. T1–T3. **j**. Hind leg. **k**. Ovipositor sheath. **l**. T1.

Host

Leucoptera coffeella (Guérin-Méneville & Perrottet, 1842) (Lepidoptera: Lyonetiidae) [on *Coffea arabica* L.] (according to original literature and labels under the Brazil material). Also "coffee leaf miner" on the Guadeloupe paratype labels is likely to denote *L. coffeella*.

Distribution

New to Brazil and Costa Rica; Dominica, Guadeloupe, Puerto Rico.

Remarks

The hypopygium does not reach the apex of the metasoma in specimens we have examined, and specimens from Costa Rica are slightly darker (brown).

Centistidea latisulca sp. nov.

urn:lsid:zoobank.org:act:ED439462-9FFB-43D6-A4EF-D4DDA2071104

Fig. 4

Diagnosis

Body length 1.9 mm, color varies from yellow-brown to black-brown (Fig. 4a); head 1.8 × as wide as long dorsally; eyes 1.8 × as long as temple in dorsal view; POL:OD:OOL = 1.3:1.0:2.4 (Fig. 4b); antenna (Fig. 4d) 1.1 × as long as body length, with penultimate flagellomeres abruptly narrowed, 3.6 × as long as wide; mesoscutum (Fig. 4e) largely polished posteriorly, notauli more strongly depressed at anterior ⅓; scutellar sulcus broadly furrowed with sparse crenulation; scutellum nearly polished, hind depressions large, ovoid, and touching each other; median longitudinal carina on propodeum split to transverse carinae near apical extremity, along with regularly transverse rugae, arched ridged anterolaterally, irregular rugae elsewhere; fore wing with vein 1-R1 0.2 of pterostigma length; T1 (Fig. 4k) 3.9 × as long as its subapical maximum width; T2 weakly sclerotized, medio-longitudinal plate petiolate basally, transverse part extremely narrow to indistinct; T3 0.8 × as long as T2, weakly longitudinally striate, polished at apical margin; ovipositor sheath nearly half length of hind basitarsus.

Etymology

The specific name '*latisulca*' derives from the Latin, referring to the broad scutellar sulcus.

Type material

Holotype

BRAZIL • ♀; Nova Teutonia; 27.1833° S, 52.3833° W; F. Plaumann leg.; 8 Sep. 1937; B.M.1937-656; NHMUK010639670; NHMUK.

Paratypes

BELIZE • 1 ♀; Cayo District Pook's Hill Lodge; 17.1542° N, 88.8522° W; 1 Oct. 2008; V. and R. Snaddon leg.; Malaise trap; NHMUK010639530; NHMUK • 1 ♀; Toledo, Punta Gorda; 12–26 May 1982; Kelly and George leg.; NHMUK010639514; NHMUK.

BRAZIL • 1 ♀; same data as for holotype; 11 Jul. 1937; B.M.1938-656; NHMUK010639656; NHMUK • 1 ♀; same data as for preceding; 12 Jun. 1937; NHMUK010639664; NHMUK • 1 ♀; same data as for preceding; 14 Jun. 1937; NHMUK010639649; NHMUK • 2 ♂♂; same data as for preceding; 28 Jul. 1937; NHMUK010639631, NHMUK010639665; NHMUK • 1 ♂; same data as for preceding; 11 Oct. 1937; 010639672; NHMUK • 1 ♀; same data as for holotype; 12 Apr. 1938; NHMUK010639662; NHMUK • 1 ♀; same data as for holotype; 13 Apr. 1938; NHMUK010639639; NHMUK • 1 ♀;

same data as for holotype; 27 Apr. 1938; NHMUK010639667; NHMUK • 1 ♀; same data as for holotype; 30 Apr. 1938; NHMUK010639673; NHMUK • 1 ♀; same data as for holotype; 3 May 1938; NHMUK010639648; NHMUK • 1 ♀; same data as for holotype; 13 May 1938; NHMUK010639632; NHMUK • 1 ♀; same data as for holotype; 18 May 1938; NHMUK010639646; NHMUK • 1 ♀; same data as for holotype; 27 Jul. 1938; NHMUK010639647; NHMUK • 2 ♂♂; same data as for preceding; 9 Aug. 1938; NHMUK010639653, NHMUK010639642; NHMUK • 1 ♂; same data as for holotype; 18 Mar. 1937; B.M.1937-424; NHMUK010639669; NHMUK • 1 ♂; same data as for holotype; 17 Feb. 1945; B.M.1957-341; NHMUK010639657; NHMUK • 1 ♀; same data as for holotype; 28 Aug. 1938; B.M.1938-458; NHMUK010639643; NHMUK • 1 ♀; same data as for holotype; 11 Feb. 1937; NHMUK010639641; NHMUK • 1 ♀; same data as for holotype; 8 Feb. 1937; NHMUK010639495; NHMUK • 1 ♀; same data as for holotype; Aug. 1935; NHMUK010639637; NHMUK • 1 ♂; same data

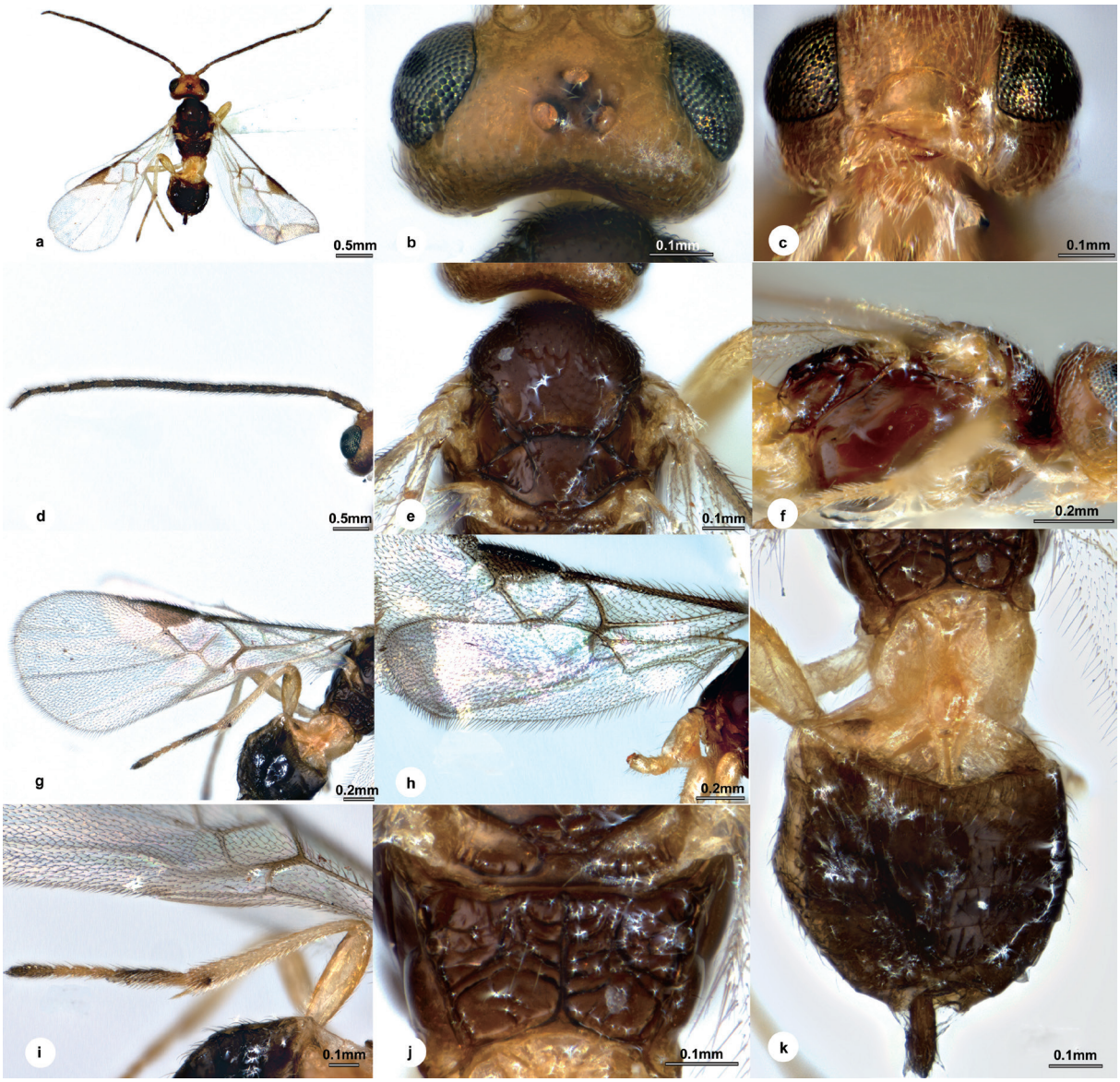

Fig. 4. *Centistidea latisulca* sp. nov., ♀, holotype (NHMUK010639670). **a**. Habitus, dorsal view. **b**. Head, dorsal view. **c**. Head, frontal view. **d**. Antenna. **e**. Mesoscutum and scutellum, dorsal view. **f**. Mesopleuron, lateral view. **g**. Fore wing. **h**. Hind wing. **i**. Hind leg. **j**. Propodeum. **k**. Metasoma, dorsal view.

as for holotype; 25 Sep. 1935; NHMUK010639634; NHMUK • 1 ♀; same data as for holotype; 28 Aug. 1944; B.M.1957-341; NHMUK010639513; NHMUK.

COSTA RICA • 1 ♀; "P.N. de Guanacaste Santa Rosa Sector"; 9 Sep. 1989; J Memmott leg.; NHMUK010639503; NHMUK.

MEXICO • 1 ♀; Teapa, Tabasco; Jan. 1904; "Godman-Salvin expedition"; NHMUK010639523; NHMUK • 1 ♀; Chilpancingo, Guerrero; 1402 m a.s.l.; "June // H.H.S. // March, H.H.S."; Jan. 1904; Godman-Salvin expedition; NHMUK010639491; NHMUK.

TRINIDAD • 2 ♀♀; St. Augustine; Aug. 1976; 010639496; NHMUK010639522; NHMUK • 2 ♀♀; "W.I., St. Augustine, Bennett"; Aug. 1976; NHMUK010639504, NHMUK010639536; NHMUK • 1 ♀; same data as for preceding; Feb. 1978; NHMUK010639499; NHMUK.

Description

Female

Measurements. Body length 1.9 mm, fore wing length 2.2 mm (Fig. 4a).

Head. 1.8 × as wide as long dorsally, 1.3 × as wide as mesoscutum. Eyes 1.8 × as long as temple in dorsal view. Temple less shiny, somewhat rough with dense setae, slightly and roundly constricted behind eye. Ocelli small, distance between fore and hind ocellus 1.1 × as long as minor axis of a hind ocellus, POL:OD:OOL = 1.3:1.0:2.4 (Fig. 4b). Frons flat and polished. Vertex between eye and hind ocellus a little shiny and smooth with small, sparse setose punctures. Face (Fig. 4c) nearly smooth, densely pubescent, subparallel-sided, rather transverse, 2.0 × as wide as high. Clypeus 2.0 × as wide as median length, nearly polished. Length of malar space 0.4 × as long as basal width of mandible. Antenna (Fig. 4d) 1.1 × as long as body length, with scape, pedicel and 1st, 2nd, penultimate and ultimate flagellomeres 2.3, 1.8, 4.7, 4.6, 3.6 and 4.0 × as long as wide, 1st 1.1 × as long as 2nd, flagellomeres gradually shortened to penultimate one, the latter abruptly narrowed.

Mesosoma. Length:width:height = 1.4:1.0:1.0. Mesoscutum (Fig. 4e) less shiny with evenly distributed small setose punctures, largely polished posteriorly, notauli more strongly depressed at anterior ⅓. Scutellar sulcus nearly straight, broadly furrowed with sparse crenulation. Scutellum not shiny, nearly polished, hind depressions large, ovoid, and touching each other. Propodeum slightly shiny, 2.6 × as long as metanotum in median length, median longitudinal carina split to transverse carinae closing to apical extremity, along with regularly transverse rugae, arched ridged antero-laterally, irregularly rugose elsewhere. Mesopleuron (Fig. 4f) highly polished, smooth.

Legs. Hind femur 3.1 × as long as its widest part. Length of hind femur:tibia:basitarsus = 1.6:2.4:1.0. Hind basitarsus 0.8 × as long as tarsomeres 2–5 combined (Fig. 4i).

Wings. Fore wing (Fig. 4g): pterostigma 3.2 × as long as its widest part, vein 1-R1 triangular, 0.2 of pterostigma length; vein r distinct, r:2-SR:2-M = 1.0:6.1:2.3, 1-SR:1-M = 1.0:5.0, 2-CU1 1.6 × as long as 1-CU1; first discal cell of fore wing nearly 1.5 × as wide as high. Hind wing (Fig. 4h): vein M+CU:1-M:r-m = 1.5:1.7:1.0.

Metasoma. Indistinctly longer than mesosoma. T1 (Fig. 4k) smooth and polished, distinctly narrowed antero-medially, spatula-shaped, 3.9 × as long as its subapical maximum width. T2 weakly sclerotized, petiolate basally, transverse part extremely narrow to indistinct, not longitudinally striate laterally. T3 0.8 × as long as T2, weakly longitudinally striate, polished at apical margin. Hypopygium not reaching apex of metasoma. Ovipositor sheath (Fig. 4k) short, nearly half length of hind basitarsus, with setae dense apically.

Color. Dark brown, except head yellow-brown and T1 yellow (Fig. 4a). Eyes with green metallic reflection. Palpi and spurs pale yellow. Antenna dark brown except scape, pedicel and basal of 1st flagellomere paler. Legs all pale yellow to yellow except hind basitarsus with apical tarsomere dark brown and other hind tarsomeres yellow-brown. Wing membrane hyaline, pterostigma brown with pale opaque apex, veins C+SC+R and up border of pterostigma dark brown, vein r, 2-SR, 1-SR, 1-M and 1-CU1 brown, other veins pale brown.

Variation. Body color varying from yellow-brown to black-brown. Vertex some with weak striation at bottom.

Male

Similar to female except body smaller with longer antenna, penultimate flagellomere nearly 4 × as long as wide.

Host

Unknown.

Distribution

Belize, Brazil, Costa Rica, Mexico, Trinidad.

Remarks

This species is quite similar to *C. insularis* (Muesebeck, 1937) but differs in the following characters: propodeum distinctly more transverse, 1.8 × as wide as median length (less transverse, 1.4 × in *C. insularis*); face more transverse, 2.0 × as wide as high (1.4 × in *C. insularis*); and T3 weakly longitudinally striate except polished apical margin (not longitudinally striate in *C. insularis*). Besides, the body is distinctly darker and longer in *C. latisulca* (dark brown, 1.9 mm) than in *C. insularis* (yellow or yellow-brown, 1.5 mm).

Centistidea radialis sp. nov.

urn:lsid:zoobank.org:act:C390F090-392A-454F-812F-5EF447941CC8

Fig. 5

Diagnosis

Body length 1.5 mm, dark brown, except T1 yellow-brown, T1–T2 white laterally and tergites posterior to T2 pale brown (Fig. 5a, l); head 1.8 × as wide as long dorsally; eyes 1.5 × as long as temple dorsally; POL:OD:OOL = 1.2:1.0:2.7 (Fig. 5b); face (Fig. 5c) strongly convergent ventrally; antenna (Fig. 5d) with penultimate flagellomere 2.2 × as long as wide; mesoscutum (Fig. 5e) minutely finely wrinkled between punctures, notauli more strongly depressed reaching to anterior ⅓; scutellar sulcus smooth; hind depressions medium-sized and oblong, interspace at least half length of minor axis of a depression (Fig. 5h); propodeum (Fig. 5k) with median longitudinal carina split to transverse carinae near apical extremity; fore wing with vein 1-R1 0.3 of pterostigma length; T1 (Fig. 5l) 2.7 × as long as its subapical maximum width; T2 inverted ‘T’ shape, 3.0 × as wide as median length; T3 1.1 × as long as T2, weakly longitudinally striate; ovipositor sheath (Fig. 5j) 0.8 × as long as hind basitarsus.

Etymology

The specific name ‘*radialis*’ derives from the Latin, referring to the radial microsculpture between punctures on the dorsal mesosoma.

Type material

Holotype

BELIZE • ♀; Toledo, Punta Gorda; 12–26 May 1982; Kelly and George leg.; NHMUK010639540; NHMUK.

Paratypes

BELIZE • 1 ♀; Toledo, Punta Gorda, foot of Saddleback Hill; 17–21 Aug. 1978; NHMUK010639576; NHMUK.

BRAZIL • 1 ♀; Nova Teutonia; 27.1833° S, 52.3833° W; 12 Apr. 1938; F. Plaumann leg.; B.M.1938-682; NHMUK010639603; NHMUK.

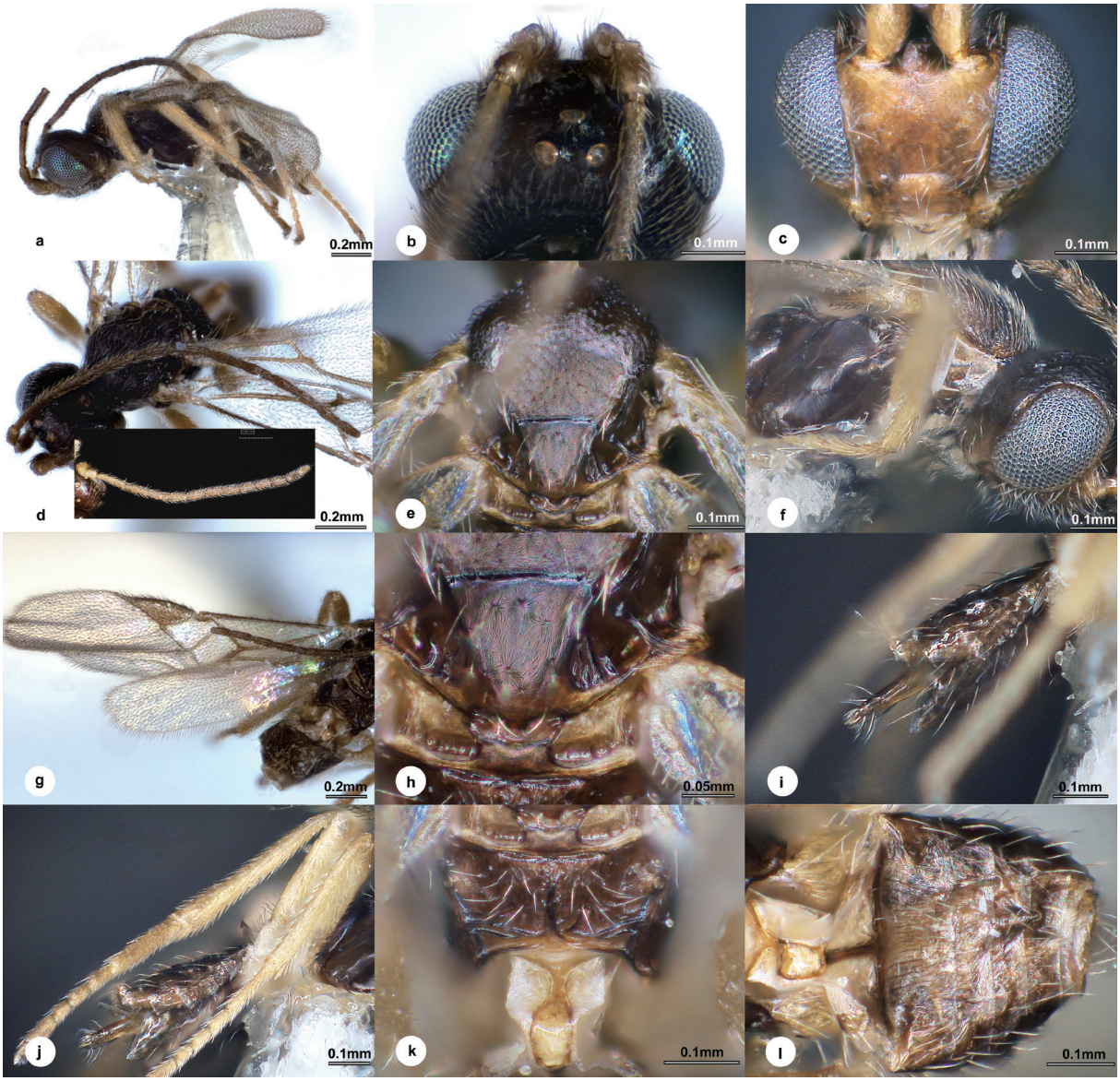

Fig. 5. *Centistidea radialis* sp. nov., ♀, holotype (NHMUK010639540). **a**. Habitus, lateral view. **b**. Head, dorsal view. **c**. Head, frontal view. **d**. Antenna. **e**. Mesoscutum. **f**. Mesopleuron. **g**. Wings. **h**. Scutellum. **i**. Ovipositor sheath. **j**. Hind leg. **k**. Propodeum and T1, dorsal view. **l**. Metasoma, dorsal view.

Description

Female

Measurements. Body length 1.5 mm, fore wing length 1.7 mm (Fig. 5a).

Head. 1.8 × as wide as long dorsally, 1.4 × as wide as mesoscutum. Eyes 1.5 × as long as temple in dorsal view. Temple less shiny with dense setae, slightly and roundly constricted behind eyes in dorsal view (Fig. 5b). Ocelli small, distance between fore and hind ocellus 1.1 × as long as minor axis of a hind ocellus, POL:OD:OOL = 1.2:1.0:2.7. Frons flat and polished. Vertex between eye and hind ocellus a little shiny and smooth with small, sparse setose punctures. Face (Fig. 5c) nearly smooth, less pubescent, strongly converged towards apex, 1.3 × as wide as high. Clypeus 2.7 × as wide as median length, nearly polished except few setae. Length of malar space 1.9 × as long as basal width of mandible. Antenna (Fig. 5d) slightly longer than body length, with scape, pedicel and 1st, 2nd, penultimate and ultimate flagellomeres 1.6, 1.3, 5.0, 4.2, 2.2 and 2.1 × as long as wide, 1st 1.2 × as long as 2nd, flagellomeres gradually shortened to penultimate one.

Mesosoma. Length:width:height = 2.0:1.0:1.3. Mesoscutum (Fig. 5e) a little shiny with evenly distributed small punctures, minutely finely wrinkled between punctures, notauli more strongly depressed reaching to anterior ⅓. Scutellar sulcus straight, narrow and shallowly concave, not crenulate. Scutellum a little shiny, nearly polished except several sparse setal punctures, minutely finely wrinkled at intervals, hind depressions medium-sized and oblong, interspace at least half length of minor axis of a depression. Propodeum less shiny, shorter, 1.8 × as long as metanotum in median length, median longitudinal carina split to transverse carinae near apical extremity, weakly rugulose anteriorly, elsewhere polished. Mesopleuron (Fig. 5f) highly polished, smooth.

Legs. Hind femur 3.5 × as long as its widest part. Length of hind femur:tibia:basitarsus = 1.6:2.3:1.0. Hind basitarsus 0.6 as long as tarsomeres 2–5 combined (Fig. 5j).

Wings. Fore wing (Fig. 5g): pterostigma 2.5 × as long as its widest part, vein 1-R1 triangular, 0.3 of pterostigma length; vein r distinct, r:2-SR:2-M = 1.0:6.7:2.0, 1-SR:1-M = 1.0:2.2, 2-CU1 1.5 × as long as 1-CU1; first discal cell of fore wing nearly 1.5 × as wide as high. Hind wing: vein M+CU:1-M:r-m = 1.6:1.9:1.0.

Metasoma. 0.8 × as long as mesosoma. T1 (Fig. 5l) smooth and polished, distinctly narrowed antero-medially, spatula-shaped 2.7 × as long as its subapical maximum width. T2 inverted 'T' shape, 3.0 × as wide as median length, not longitudinally striate laterally. T3 1.1 × as long as T2, weakly longitudinally striate. Hypopygium outreaching apex of metasoma. Ovipositor sheath (Fig. 5j) short, 0.8 × as long as hind basitarsus, with setae dense apically.

Color. Dark brown, except T1 yellow-brown, T1–T2 white laterally and tergites posterior to T2 pale brown (Fig. 5a, l). Palpi and spurs pale yellow. Antenna dark brown. Legs all yellow except apical tarsomeres somewhat yellow-brown. Wing membrane hyaline, pterostigma brown, veins C+SC+R, r, 2-SR, 1-SR, 1-M, M+CU, 1-CU1 and 2-CU2 brown, other veins pale brown.

Variation. Scutellar sulcus slightly curved and T2 slightly triangular posteriorly on specimen from Saddleback Hill.

Male

Unknown.

Host

Unknown.

Distribution

Belize, Brazil.

Remarks

This species is similar to *C. ubangus* (Papp, 2013) but differs in the following characters: T1 spatula-shaped (indistinctly constricted towards apex) (spoon-shaped in *C. ubangus*); median longitudinal carina bifurcated before apex of propodeum (median longitudinal carina reaches apical margin in *C. ubangus*); and first discal cell of fore wing nearly 1.5 × as wide as high (1.1 × as wide as high in *C. ubangus*).

Centistidea striata Penteado-Dias, 1999

Centistidea striata Penteado-Dias, 1999: 192; holotype in Departamento de Ecologia e Biologia Evolutiva, Universidade Federal de Sao Carlos, Brazil (not examined).

Mirax (*Centistidea*) *striata* – Papp 2013: 127.
Centistidea striata – Yu *et al.* 2016.

Diagnosis

Body length 1.6 mm; head and mesosoma honey yellow; head wider than mesosoma, mostly smooth and shining, occiput striate; antenna about as long as body, first flagellar segment distinctly longer than second segment; notauli impressed on less than anterior third of mesoscutum, largely absent on disc; scutellar sulcus deep, not foveolate, mesoscutum and scutellum weakly punctate; propodeum with a complete median longitudinal carina and a few irregular transverse rugae on either side of carina; vein r almost completely obliterated; sclerotized part of T2 reduced to a very narrow longitudinal strip which is widened apically; T1 and T2 laterotergites membranous and finely longitudinally striate; T3 finely longitudinally striate basally (following Penteado-Dias 1999).

Host

Leucoptera coffeella (Guérin-Menèville, 1842) (Lepidoptera: Lyonetiidae) (Penteado-Dias 1999).

Distribution

Brazil.

Remarks

Penteado-Dias (1999) mentioned that it was separated from *C. insularis*, both sharing the same host, *Leucoptera coffeella*, by the yellow mesosoma, the length of the side of ocellar triangle to OOL and the color of the third and following tergites. But the distinction does not seem that obvious based on our examination of the paratypes of *C. insularis* here. Based on our examination, *C. insularis* can be better distinguished by the less developed notauli on the mesoscutum, not foveolate scutellar sulcus and the shape of T2.

Centistidea vertus (Papp, 2013)
Fig. 6

Mirax (*Centistidea*) *vertus* Papp, 2013: 121; holotype in Instituto Alexander von Humbolt, Villa de Leyva, Colombia (not examined).

Centistidea vertus – Yu *et al.* 2016.

Diagnosis

Body length 2.8 mm; head brown-black, mesosoma and metasoma black (Fig. 6a); antenna (Fig. 6f) about 1.6 × as long as body, first flagellomere 7 × as long as broad preapically, penultimate flagellomere almost 4 × as long as broad; head 1.7 × as broad as long in dorsal view; eye slightly protruding and 1.5 × as long as temple, temple rounded (Fig. 6e); inner margin of eyes parallel, face 1.5 × as wide as high (Fig. 6g); mesoscutum and scutellum uneven and dull (Fig. 6b); propodeum (Fig. 6c, f) rugulose with carinulate-areolate elements; hind femur 4.1 × as long as broad distally; pterostigma narrow, 3.3 × as long as wide and issuing r proximally from its midpoint; vein 2-SR 1.5 × as long as width of pterostigma; T1 (Fig. 6d) spoon-shaped, broadening and convex, T2 fairly wide and straight; ovipositor sheath as long as hind tarsomeres 2–3 (following Papp 2013).

Material examined

BRAZIL • 1 ♀; Nova Teutonia; 27.1833° S, 52.3833° W; F. Plaumann leg.; 18 May 1937; B.M.1937-656; NHMUK010639543; NHMUK • 1 ♀; same data as for preceding; 21 Jun. 1937; NHMUK010639584; NHMUK • 1 ♀; same data as preceding; 10 Jul. 1937; NHMUK010639585; NHMUK • 1 ♂; same data as preceding; 26 Jul. 1937; NHMUK010639588; NHMUK • 1 ♂; same data as preceding; 30 Jul. 1937; NHMUK010639544; NHMUK • 1 ♀; same data as for preceding; 19 Nov. 1937; B.M.1937-748; NHMUK010639619; NHMUK • 1 ♀; same data as for preceding; 28 Dec. 1937; NHMUK010639627 • 1 ♀; same data as for preceding; 17 Aug. 1937; NHMUK010639613 • 2 ♂♂; same data as for preceding; NHMUK010639572, NHMUK010639569; NHMUK • 1 ♀; same data as for preceding; 14 Nov. 1938; B.M.1938-682; NHMUK010639623; NHMUK • 1 ♂; same data as for preceding 6 Apr. 1938; NHMUK010639575; NHMUK • 1 ♀; same data as for preceding; 17 Nov. 1938; B.M.1938-312; NHMUK010639587; NHMUK • 2 ♂♂; same data as for preceding; 18 Oct. 1938; NHMUK010639609, NHMUK010639591; NHMUK • 1 ♀; same data as for preceding; 7 Jan. 1945; B.M.1957-341; NHMUK010639598; NHMUK • 1 ♀; same data as for preceding; 11 Jun. 1935; NHMUK010639570; NHMUK • 1 ♀; same data as for preceding; 25 Sep. 1935; NHMUK010639601; NHMUK • 1 ♂; same data as for preceding; 10 Sep. 1935; NHMUK010639614; NHMUK • 1 ♂; same data as for preceding; 25 Sep. 1935; NHMUK010639606; NHMUK.

Host

Unknown.

Distribution

New to Brazil; Colombia.

Remarks

It is worth noting that the hypopygium is well developed, surpassing the apex of the metasoma in specimens we have seen (Fig. 6a) and specimens from Brazil are distinctly lighter (yellow-brown) on the middle part of the mesosoma (Fig. 6b).

Discussion

Papp (2013) contributed a great deal to our understanding of Miracinae of the Neotropical region. He concluded that nearly every species could be assigned to a separate subgenus or species-group, if the subgenus criteria of van Achterberg & Mehernejad (2002) were employed for the Neotropical species. This demonstrates the great diversity of this group in the Neotropical region.

Compared with other realms, Neotropical species of Miracinae exhibit more variety in the sculpture of the propodeum (carinae of variable shapes), the shapes of the sclerotized part of T2 and the features of the scutellar hind depressions. They also differ with respect to the notauli in length and strength (e.g., *C. brasiliensis*). However, little variation has been observed in wing venation, especially the length of the metacarp, which has always been portrayed as a short triangular extension of the pterostigma, which, however, are of different lengths in Oriental species. More material from other parts of the Neotropical region is essential to better understand the evolutionary processes and relationships among different regions.

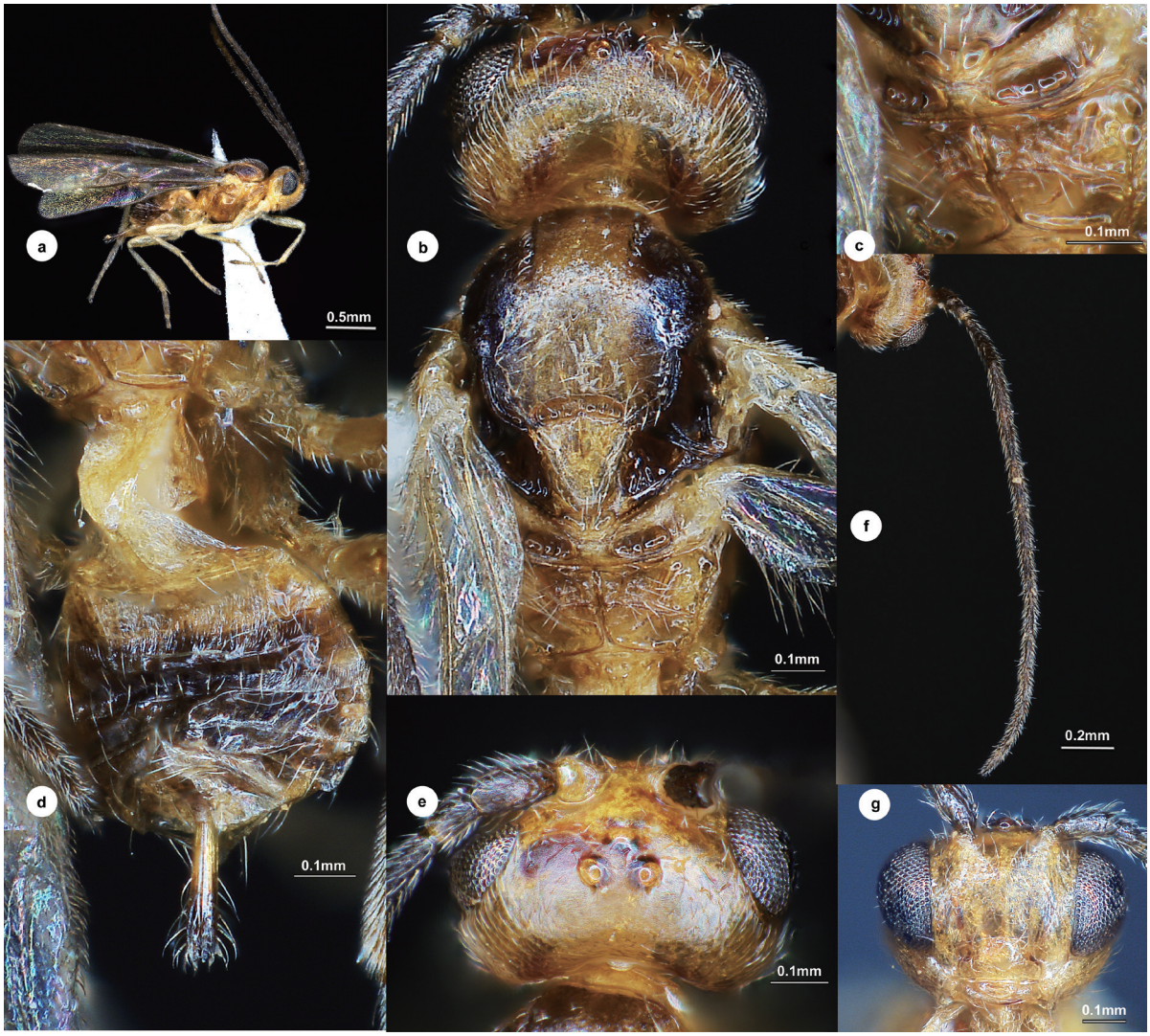

Fig. 6. *Centistidea vertus* (Papp, 2013), ♀ (NHMUK010639543). **a**. Habitus, lateral view. **b**. Mesosoma, dorsal view. **c**. Propodeum. **d**. Metasoma and ovipositor sheath, dorsal view. **e**. Head, dorsal view. **f**. Antenna. **g**. Head, frontal view.

Acknowledgments

We are grateful to the collectors for their efforts in the field. We also thank Dr Gavin Broad and Dr Joseph Monks for their help during the course of this study. Funding for this study was provided by the China Scholarship Council (202208430072), the Scientific Research Fund of Hunan Provincial Education Department (23B0654) and the Hunan Provincial Natural Science Foundation of China (2023JJ30434).

References

Branner J.C. & Brues C.T. 1912. Brazilian Ichneumonidae and Braconidae obtained by the Stanford expedition. *Annals of the Entomological Society of America* 5 (3): 193–228. https://doi.org/10.1093/aesa/5.3.193

Braet Y. 2006. Coup doeil sur la biodiversité des Braconidae (Hymenoptera, Ichneumonoidea) de Guyane française et reclassification de certaines espèces décrites par Brullé. *Bulletin de la Société royale belge d'Entomologie* 142 (7–12): 155–172.

Cauich-Kumul R., López-Martínez V., Jesús García-Ramírez M., Delfín-González H. & Burgos-Solorio A. 2014. Two new species of braconid wasps (Hymenoptera: Braconidae: Miracinae: *Mirax* and Rogadinae: *Choreborogas*) from Mexico. *Florida Entomologist* 97 (3): 902–910. https://doi.org/10.1653/024.097.0348

Harris R.A. 1979. Glossary of surface sculpturing. *Occasional Papers in Entomology of the California Department of Food and Agriculture* 28: 1–31.

Liu Z. & Polaszek A. 2024a. First records of Miracinae (Hymenoptera: Braconidae) from Borneo with description of two new species. *European Journal of Taxonomy* 935: 283–292. https://doi.org/10.5852/ejt.2024.935.2563

Liu Z. & Polaszek A. 2024b. First record of *Centistidea* Rohwer (Hymenoptera: Braconidae: Miracinae) from Borneo, with description of six new species. *Journal of Natural History* 58 (45–48): 1979–2002. https://doi.org/10.1080/00222933.2024.2397550

Marsh P.M. 1979. Descriptions of new Braconidae (Hymenoptera) parasitic on the potato tuberworm and on related Lepidoptera from Central and South America. *Journal of the Washington Academy of Sciences* 69 (2): 12–17.

Muesebeck C.F.W. 1937. A new West Indian species of *Mirax* Haliday parasitic on the coffee leafminer (Hymenoptera: Braconidae). *Proceedings of the Entomological Society of Washington* 39 (6): 139–141.

Papp J. 1993. New braconid wasps (Hymenoptera, Braconidae) in the Hungarian Natural History Museum, 4. *Annales Historico-Naturales Musei Nationalis Hungarici* 84: 155–180.

Papp J. 2013. Eleven new *Mirax* Haliday, 1833 species from Colombia and Honduras and key to the sixteen Neotropical *Mirax* species (Hymenoptera: Braconidae: Miracinae). *Acta Zoologica Academiae Scientiarum Hungaricae* 59 (2): 97–129.

Penteado-Dias A.M. 1999. New species of parasitoids on *Perileucoptera coffeella* (Guérin-Méneville) (Lepidoptera, Lyonetiidae) from Brazil. *Zoologische Mededelingen* 73: 189–197.

Ranjith A.P., van Achterberg C. & Priyadarsanan D.R. 2023. A new genus in the braconid subfamily Miracinae from the Oriental region, with descriptions of seven new species from India and Sri Lanka. *Zootaxa* 5318 (4): 451–473. https://doi.org/10.11646/zootaxa.5318.4.1

Ratnasingham S., Wei C., Chan D., Agda J., Agda J., Ballesteros-Mejia L., Ait Boutou H., El Bastami Z.M., Ma E., Manjunath R., Rea D., Ho C., Telfer A., McKeowan J., Rahulan M., Steinke C., Dorsheimer J., Milton M., Hebert P.D.N. (2024). BOLD v4: A Centralized Bioinformatics Platform for DNA-Based

Biodiversity Data. In DNA Barcoding: Methods and Protocols, chapter 26: 403–441. Springer US, NY. Available from https://boldsystems.org [accessed 15 Jun. 2024]. https://doi.org/10.1007/978-1-0716-3581-0_26

Shenefelt R.D. 1973. Braconidae 5, Microgastrinae and Ichneutinae. *In*: van der Vecht J. & Shenefelt R.D. (eds) *Hymenopterorum Catalogus, Part 9*: 669–812. Dr W. Junk, Gravenhage.

Slater-Baker M.R., Austin A.D., Whitfield J.B. & Fagan-Jeffries E.P. 2022. First record of miracine parasitoid wasps (Hymenoptera: Braconidae) from Australia: molecular phylogenetics and morphology reveal multiple new species. *Austral Entomology* 61: 49–67. https://doi.org/10.1111/aen.12582

van Achterberg C. 1993. Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea). *Zoologische Verhandelingen* 283: 1–189.

van Achterberg C. & Mehrnejad M.R. 2002. The braconid parasitoids (Hymenoptera: Braconidae) of *Kermania pistaciella* Amsel (Lepidoptera: Tineidae: Hieroxestinae) in Iran. *Zoologische Mededelingen* 76 (2): 27–39.

Yu D.S., van Achterberg C. & Horstmann, K. 2016. World Ichneumonoidea 2015. Taxonomy, Biology, Morphology and Distribution. Nepean, Ottawa, Canada. [database on flash-drive]

Printed versions of all papers are deposited in the libraries of four of the institutes that are members of the *EJT* consortium: Muséum national d'Histoire naturelle, Paris, France; Meise Botanic Garden, Belgium; Royal Museum for Central Africa, Tervuren, Belgium; Royal Belgian Institute of Natural Sciences, Brussels, Belgium. The other members of the consortium are: Natural History Museum of Denmark, Copenhagen, Denmark; Naturalis Biodiversity Center, Leiden, the Netherlands; Museo Nacional de Ciencias Naturales-CSIC, Madrid, Spain; Leibniz Institute for the Analysis of Biodiversity Change, Bonn – Hamburg, Germany; National Museum of the Czech Republic, Prague, Czech Republic; The Steinhardt Museum of Natural History, Tel Aviv, Israël.