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Revision of *Calliscelio* Ashmead (Hymenoptera: Platygastroidea: Scelionidae) of the Indian region with descriptions of new species

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Abstract. The genus *Calliscelio* (Platygastroidea: Scelionidae) of the Indian region is revised. Ten new species of *Calliscelio*, viz., *Calliscelio abbakkae* Veenakumari sp. nov., *C. brennanae* Veenakumari sp. nov., *C. gulika* Veenakumari sp. nov., *C. heramba* Veenakumari sp. nov., *C. kaliya* Veenakumari sp. nov., *C. obavvae* Veenakumari sp. nov., *C. pinaki* Veenakumari sp. nov., *C. shesha* Veenakumari sp. nov., *C. sundari* Veenakumari sp. nov. and *C. ulupi* Veenakumari sp. nov. are described from India. Eight species previously known from this region are redescribed: *Calliscelio agaliensis* Narendran & Ramesh Babu, 1999, *C. carinatus* Narendran & Ramesh Babu, 1999, *C. coorgensis* Sharma, 1982, *C. glabratus* Rajmohana, 2014, *C. indicus* Narendran & Ramesh Babu, 1999, *C. longicarinatus* Narendran & Ramesh Babu, 1999, *C. orientalis* Sharma, 1978, and *C. rugosus* Rajmohana & Peter, 2012. Two species have been synonymized: *Calliscelio tiro* Kozlov & Lê, 2000 syn. nov. is treated as a junior synonym of *C. orientalis* Sharma, 1978; and *Calliscelio urgo* Kozlov & Lê, 2000 syn. nov. is treated as a junior synonym of *C. indicus* Narendran & Ramesh Babu, 1999. *Dicroscelio emarginatus* (Narendran & Ramesh Babu, 1999) comb. nov. is transferred from *Calliscelio* Ashmead. A new species group – the *elegans* species group – is proposed. The previously described *C. coromandelensis* has been excluded from this genus. Keys to the females and known males of the Indian species of *Calliscelio* are furnished along with illustrations.

Keywords. Biodiversity, crickets, *Dicroscelio*, Oriental, taxonomy.

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Introduction

Ashmead (1893) erected the genus *Calliscelio* with *C. laticinctus* Ashmead, 1893 as the type species from the Lesser Antilles. So far, 115 species of *Calliscelio* have been described from all biogeographic regions of the world, with the maximum number – 42 species – being from the New World, of which 38 were hitherto undescribed species (Chen *et al.* 2017; Popovici *et al.* 2024; MBD 2025). Though Masner (1972) initially considered *Calliscelio* a junior synonym of *Calotelea* Westwood, 1837, he later resurrected its generic status and expanded its generic limits (Masner 1976, 1980). Talamas *et al.* (2016) studied the morphological characters and identified a synapomorphic character – a prioniform sensillum situated at the base of the middle tooth of the mandible – as diagnostic of the genus. As a result of this study, three Australian genera *Crama* Galloway, 1984, *Lispoteleia* Galloway, 1984 and *Yunkara* Galloway, 1984, and the genus *Xentor* Masner & Johnson, 2007, endemic to the Fijian archipelago, were treated as junior synonyms of *Calliscelio*.

Two species, *C. rubriclavus* (Ashmead, 1887) and *C. elegans* (Perkins, 1910), are worldwide in distribution, the result probably of globalisation and the consequent increase in commerce internationally (Masner *et al.* 2009).

Host records of *Calliscelio* are limited. Eggs of the black field cricket, *Teleogryllus commodus* (Walker, 1869) (Orthoptera: Gryllidae), were parasitized by *C. teleogrylli* Hill, 1983, in New Zealand (Hill 1983). This was the first definitive host record for *Calliscelio*. Masner *et al.* (2009) mentioned that *C. elegans*, a widely distributed species, is probably an egg parasitoid of Gryllidae Bolívar, 1878 occurring in sugarcane (*Saccharum officinarum* L., Poaceae) ecosystems, as they were first collected by Albert Koebele from around the roots of sugarcane in Hawaii. Sugarcane being an extensively cultivated crop around the globe with a wide geographic distribution may account for the spread of this parasitoid to so many parts of the world.

Eighteen species of *Calliscelio* are known from the Oriental region. Of these, ten species were described from India: *C. agaliensis* Narendran & Ramesh Babu, 1999, *C. carinatus* Narendran & Ramesh Babu, 1999, *C. coorgensis* Sharma, 1982, *C. coromandelensis* Sharma, 1978, *C. emarginatus* Narendran & Ramesh Babu, 1999, *C. glabratus* Rajmohana, 2014, *C. indicus* Narendran & Ramesh Babu, 1999, *C. longicarinatus* Narendran & Ramesh Babu, 1999, *C. orientalis* Sharma, 1978, and *C. rugosus* Rajmohana & Peter, 2012 (Perkins 1910; Saraswat & Sharma 1978; Mani & Sharma 1982; Sharma 1982; Johnson 1992; Narendran & Ramesh Babu 1999; Rajmohana & Peter 2012; Rajmohana 2014; MBD 2025). The status of two additional species described from India have undergone changes since they were first described: *Calotelea tanugatra* Narendran, 1981 was treated as a junior synonym of *Calliscelio elegans* (Rajmohana *et al.* 2013), and *Calliscelio malabaricus* Narendran & Ramesh Babu, 1999 was transferred to *Calotelea* (Debnath *et al.* 2024). These taxonomic actions resulted in eleven species constituting the fauna of *Calliscelio* in India.

The remaining seven Oriental species are from Southeast Asia: *C. dido* Kozlov & Lê, 2000, *C. hubo* Kozlov & Lê, 2000, *C. tiro* Kozlov & Lê, 2000, and *C. urgo* Kozlov & Lê, 2000 from Vietnam, and *C. philippinensis* Kieffer, 1913, *C. pallidus* (Kieffer, 1917) and *C. luteipes* (Kieffer, 1914) from the Philippines (Johnson 1992; Lê 2000; MBD 2025).

Here, we revise *Calliscelio* of the Indian region and describe ten new species and propose a new species group. All species, except *C. coromandelensis*, are illustrated; and keys to all females, and known males, of the genus are furnished.

Material and methods

Specimens were collected from various parts of the country using multiple collection methods (e.g., yellow pan traps (YPT), sweep net (SN), and light trap). The specimens were sorted and processed under a stereo binocular light microscope (Carl Zeiss, Stemi 305). While some specimens were cleaned, and mounted on card-point tips, additional specimens were refrigerated at 4°C in vials of ethyl alcohol (70%).

For SEM studies, the specimens were affixed to a copper stub with two-sided conductive adhesive copper tape and imaged with a Hitachi Table-top microscope TM3030 (SEM: Environmental Scanning Electron Microscope).

All other images were taken with a Leica M205A stereo microscope (1 × objective), and Leica DFC-500 digital camera with LED ring light illuminator. The images were stacked using Leica Application Suite (LAS) software.

Measurements were taken following Mikó *et al.* (2010). The length of the metasomal tergite was measured medially, while the width was measured at its maximum extent. IOS was measured as the shortest distance between the orbits.

Terminology for morphological characters follows Masner (1980), Mikó *et al.* (2007; 2010), and Yoder *et al.* (2014), while that for macro- and micro-sculpture follows Harris (1979). The character states proposed by Chen *et al.* (2017) have been adopted for the descriptions of species. Semicolons have been used to separate character states to indicate intraspecific variations.

Images of *C. coorgensis*, *C. longicarinatus* and *C. orientalis* were accessed at the Ohio State University's Museum of Biological Diversity database (MBD 2025).

Whenever morphological features were not discernible from the images of species described earlier, the original descriptions of these species were relied upon for the redescrptions and in the construction of keys.

The holotypes and paratypes of all the new species described are deposited in the National Insect Museum (NIM), Indian Council of Agricultural Research-National Bureau of Agricultural Insect Resources, Bangalore, Karnataka, India (ICAR-NBAIR).

Abbreviations

A1–A12 = antennomeres 1–12 (A1 = scape, A2 = pedicel)
EH = eye height
IOS = interorbital space
OOL = ocular ocellar line
T1–T6 = metasomal tergites 1–6

The following abbreviations are used for museums holding the type specimens referred to in this work.

IEBR = Institute of Ecology and Biological Resources, Hanoi, Vietnam
NIM = National Insect Museum, ICAR-National Bureau of Agricultural Insect Resources, Bengaluru, India
USNM = United States National Museum of Natural History, Washington DC, USA
ZSI = Zoological Survey of India, Kolkata / Calicut, India

Results

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Superfamily Platygastroidea Haliday, 1833
Family Scelionidae Haliday, 1839
Subfamily Scelioninae Haliday, 1839

Genus *Calliscelio* Ashmead, 1893

Calliscelio Ashmead, 1893: 209, 218. Type species *Calliscelio laticinctus* Ashmead, 1893 by monotypy and original designation, keyed.

See Chen *et al.* (2017) for a complete synonymic list, diagnosis and generic description of *Calliscelio*.

Checklist of Indian species of *Calliscelio* Ashmead, 1893

Calliscelio abbakkae Veenakumari sp. nov.
Calliscelio agaliensis Narendran & Ramesh Babu, 1999
Calliscelio brennanae Veenakumari sp. nov.
Calliscelio carinatus Narendran & Ramesh Babu, 1999
Calliscelio coorgensis Sharma, 1982
Calliscelio elegans (Perkins, 1910)
Calliscelio glabratus Rajmohana, 2014
Calliscelio gulika Veenakumari sp. nov.
Calliscelio heramba Veenakumari sp. nov.
Calliscelio indicus Narendran & Ramesh Babu, 1999
Calliscelio kaliya Veenakumari sp. nov.
Calliscelio longicarinatus Narendran & Ramesh Babu, 1999
Calliscelio obavvae Veenakumari sp. nov.
Calliscelio orientalis Sharma, 1978
Calliscelio pinaki Veenakumari sp. nov.
Calliscelio rugosus Rajmohana & Peter, 2012
Calliscelio shesha Veenakumari sp. nov.
Calliscelio sundari Veenakumari sp. nov.
Calliscelio ulupi Veenakumari sp. nov.

Key to females of *Calliscelio* of India

1. Upper frons with a frontal carina beneath median ocellus (Figs 6D, 6E)
..... *Calliscelio carinatus* Narendran & Ramesh Babu, 1999
– Upper frons without frontal carina beneath median ocellus (e.g., Figs 1G, 5G, 13G, 17G) 2
2. Metascutellum slightly excavate posteromedially (Fig. 13B)
..... *Calliscelio gulika* Veenakumari sp. nov.
– Metascutellum posteromedially straight or convex, without medial excavation (e.g., Figs 1B, 14B)
..... 3
3. Epomial carina present (Figs 8D, 18F, 23A, 26F) 4
– Epomial carina absent (e.g., Figs 1F, 4F, 17F) 7

4. Horn on T1 dorsally with semicircular carinae (Fig. 26B); setae on hind tibia at most $1.5 \times$ tibial width (Fig. 26A); metascutellum with transverse carinae (Fig. 26B) *Calliscelio rugosus* Rajmohana & Peter, 2012
- Horn on T1 dorsally smooth (Figs 8C, 18B, 23A); setae on hind tibia greater than $3 \times$ tibial width (e.g., Fig. 18A); metascutellum without transverse carinae (Figs 8A, 18B; Popovici *et al.* 2024: fig. 22) 5
5. Mandible bidentate (Fig. 23C) *Calliscelio orientalis* Sharma, 1978
- Mandible tridentate (Figs 21I, 8B, 18D) 6
6. EH and IOS subequal in length; interantennal process longer than wide, smooth with median longitudinal groove (Fig. 8B) *Calliscelio dido* Kozlov & Lê, 2000
- EH distinctly greater than IOS (Fig. 18G); interantennal process wider than long with rugose sculpture (Fig. 18G) *Calliscelio kaliya* Veenakumari sp. nov.
7. Mandible bidentate (Figs 2C, 2H, 15D) 8
- Mandible tridentate (e.g., Fig. 2A, B, D, G) 9
8. IOS distinctly greater than EH (Fig. 5G); metascutellum with granular sculpture (Fig. 5B); horn on T1 dorsally reticulate (Fig. 5B); head black, mesosoma, T1 and anterior T2 golden brown, T3–T6 brown-black (Fig. 5A) *Calliscelio brennanae* Veenakumari sp. nov.
- IOS slightly less than EH (Fig. 17G); metascutellum foveate (Figs 15B, 17B); horn on T1 dorsally weakly transversely striate (Figs 15E, 17B); head, mesosoma black, metasoma black-brown (Figs 15A, 17A) *Calliscelio indicus* Narendran & Ramesh Babu, 1999
9. Frons sculptured medially (Figs 4G, 9G, 14G, 21G, 27G, 28G) 10
- Frons predominantly smooth medially (Figs 1G, 12G, 19D, 20G, 25G, 29G) 15
10. Fore wing with three distinct black bands (Figs 9E, 28E); T6 bicoloured (Figs 9C, 28C) 11
- Fore wing weakly infuscate, at most with a weak band medially (Figs 4E, 14E, 21E, 27E); T6 unicoloured (Figs 3C, 4C, 14C, 21C, 27C) 12
11. Horn on T1, almost as wide as T1 at posterior margin; anterior margin of horn on T1 truncate; posterior margin of metascutellum almost straight (Fig. 28B); hind coxa (Fig. 28F) and A3–A7 (Fig. 28D) white; head and mesosoma dark brown with orange tint (Fig. 28A) *Calliscelio sundari* Veenakumari sp. nov.
- Horn on T1, half the width of T1; anterior margin of horn on T1 rounded; posterior margin of metascutellum concave (Fig. 9B); hind coxa (Fig. 9F) and A3–A7 (Fig. 9D) yellow-brown; head and mesosoma red-brown (Fig. 9A) *Calliscelio elegans* (Perkins, 1910)
12. Posterior margin of metascutellum straight; mesoscutum and mesoscutellum with sparse, long, thick, black bristles in addition to short white setae (Fig. 14B); horn on T1 with semicircular carinae dorsally; T6 at least $3 \times$ as long as wide (Fig. 14C) *Calliscelio heramba* Veenakumari sp. nov.
- Posterior margin of metascutellum round; mesoscutum and mesoscutellum only with dense, short, thin setae (Figs 4B, 21B, 27B); horn on T1 either rugose or smooth; T6 at most $1.5 \times$ as long as wide (Figs 3C, 4C, 21C, 27C) 13
13. Setae on submarginalis long, erect, exceeding anterior margin of wing (Fig. 27E); EH at least $1.5 \times$ IOS; setae around median ocellus elongate (Fig. 27G); scutoscuteellar sulcus with complete foveae between notauli (Fig. 27B); horn on T1 smooth (Fig. 27C) *Calliscelio shesha* Veenakumari sp. nov.

- Setae on submarginalis short, not exceeding anterior margin of wing (Figs 4E, 21E); EH subequal to IOS; setae around median ocellus short (Figs 3D, 4G, 21G); scutoscuteellar sulcus not foveate between notauli (Figs 4B, 21B); horn on T1 rugose (Figs 3E, 4C, 21C) 14
- 14. Ventral metapleural area smooth with oblique striae; ventral mesopleuron smooth with sparse foveae (Fig. 21F); T6 longer than wide (Fig. 21C); entire habitus yellow-brown except for brown-black horn of T1 and posterior tergites (Fig. 21A) *Calliscelio obavvae* Veenakumari sp. nov.
- Ventral metapleural area entirely foveate except for a narrow smooth area posterodorsally; ventral mesopleuron densely foveate (Fig. 4F); T6 subequal in length and width (Figs 3C, 4C); head, mesosoma, T1 and anterior T2 yellow-brown, other tergites black-brown (Figs 3A, 4A) *Calliscelio agaliensis* Narendran & Ramesh Babu, 1999
- 15. Horn on T1 sculptured dorsally (Figs 1B, 19B, 20B) 16
- Horn on T1 smooth dorsally (Figs 12B, 25B, 29B) 17
- 16. IOS distinctly greater than EH (Fig. 1G); setae on submarginalis short, barely exceeding anterior margin of wing (Fig. 1E); horn on T1 anteriorly transversely striate and posteriorly rugose (Fig. 1C) *Calliscelio abbakkae* Veenakumari sp. nov.
- IOS distinctly less than EH (Fig. 20G); setae on submarginalis long, erect, exceeding the anterior margin of wing (Figs 19F, 20E); horn on T1 anteriorly transversely carinate and posteriorly with arched carinae (Figs 19C, 20C) *Calliscelio longicarinatus* Narendran & Ramesh Babu, 1999
- 17. Posteromedial margin of metascutellum weakly rounded, not flap-like; scutoscuteellar sulcus between notauli with complete foveae (Fig. 29B); T4 and T5, more than $3.5 \times$ as wide as long (Fig. 29C) ... *Calliscelio ulupi* Veenakumari sp. nov.
- Posteromedial margin of metascutellum lamellate, and overlapping horn on T1; scutoscuteellar sulcus between notauli either without foveae or with incomplete foveae (Figs 12B, 25B); T4 and T5 at most $2.5 \times$ as wide as long (Figs 12C, 25C) 18
- 18. Occipital carina sculptured medially (Fig. 12B); T1 elongate, at least $2 \times$ as long as wide; T6 at least $2 \times$ as long as wide (Fig. 12C); dorsal metapleural area smooth (Fig. 12F) *Calliscelio glabratus* Rajmohana, 2014
- Occipital carina not sculptured medially (Fig. 25B); T1 short, at most $1.5 \times$ as long as wide; T6 at most $1.5 \times$ as long as wide (Fig. 25C); dorsal metapleural area unevenly rugose (Fig. 25F) *Calliscelio pinaki* Veenakumari sp. nov.

Key to the known males of *Calliscelio* of India

- 1. Fore wing with three distinct black bands (Fig. 9E) *Calliscelio elegans* (Perkins, 1910)
- Fore wing without any distinct black bands, at most weakly infuscate (e.g., Figs 7A, 17E, 26E, 29E) 2
- 2. Mandible bidentate (Figs 2H, 23C) 3
- Mandible tridentate (Fig. 22C, F) 4
- 3. Flagellomeres at least $2.6 \times$ as long as wide; setae on submarginalis elongate, exceeding anterior margin of wing (Fig. 23B) *Calliscelio orientalis* Sharma, 1978
- Flagellomeres at most $1.4\text{--}2.0 \times$ as long as wide (Fig. 11B); setae on submarginalis short, not exceeding anterior margin of wing (Fig. 17E) *Calliscelio indicus* Narendran & Ramesh Babu, 1999

4. Scutoscuteellar sulcus not foveate (Fig. 7B); EH subequal to IOS (Fig. 7G) *Calliscelio coorgensis* Sharma, 1982
- Scutoscuteellar sulcus foveate (Figs 10C, 10D); EH distinctly greater than IOS (Figs 26G, 29G) 5
5. Foveae of scutoscuteellar sulcus between notauli wide; metascutellum at least $4\times$ as wide as long; mesoscutum with long, sparse setae (Fig. 10D) *Calliscelio ulupi* Veenakumari sp. nov.
- Foveae of scutoscuteellar sulcus between notauli narrow; metascutellum at most $2.8\times$ as wide as long; mesoscutum with short, dense setae (Fig. 10C) *Calliscelio rugosus* Rajmohana & Peter, 2012

Calliscelio abbakkae Veenakumari sp. nov.

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Figs 1, 2A

Diagnosis

Calliscelio abbakkae sp. nov. is similar to *C. longicarinatus*. It differs from the latter in having IOS greater than EH; short setae on submarginalis that do not surpass the anterior margin of the wing, and the horn on T1 rugose posteriorly. In *C. longicarinatus* EH is greater than IOS, the setae on submarginalis are elongate, surpassing the anterior margin of the wing, and the horn on T1 has arched carinae posteriorly.

Etymology

This species is named after Abbakka Chowta, the ‘fearless’ sixteenth century queen of Tulu Nadu, in today’s state of Karnataka, India, who repeatedly repelled attacks by the Portuguese colonisers for over four decades. The name is treated as a noun in the genitive case.

Material examined

Holotype

INDIA – **Arunachal Pradesh** • ♀; Pasighat, CHF; 28°04'28" N, 95°19'28" E; elev. 173 m; 11 Nov. 2014; YPT; NIM/NBAIR P5386.

Paratypes

INDIA – **Arunachal Pradesh** • 2 ♀♀; same data as for holotype; 10 Nov. 2014; NIM/NBAIR P5387, P5388 • 4 ♀♀; same data as holotype; 7 May 2014; YPT; NIM/NBAIR P5389 to P5392. – **Rajasthan** • 1 ♀; Bhilwara, Agarpura Chouraha, Suwana Krishi Vigyan Kendra; 25°21'29" N, 74°43'42.5" E; elev. 398 m; 3 Nov. 2014; MT; NIM/NBAIR P5393. – **West Bengal** • 1 ♀; Islampur, Teenpool; 26°15'14.4" N, 88°11'49" E; elev. 68 m; 6 Jun. 2008; SN; NIM/NBAIR P5394.

Description

Female

MEASUREMENTS. Body length: 1.98–2.32 mm (n = 9).

COLOUR. Head: light brown with uneven black patches. Mesosoma: brown to dark brown. Horn on T1: black-brown. T1: yellow-brown. T2: anteriorly yellow-brown, posteriorly light brown to dark brown. T3: brown to dark brown. T4–T6: dark brown. Antenna: radicle, A1–A5 brown, A6 dark brown, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: smooth, except for coriaceous reticulate sculpture dorsally and towards orbit. Sculpture of ventrolateral frons: smooth. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: short and sparse. Hyperoccipital carina: absent. Occipital carina: incomplete medially. Length of OOL: less than $0.5\times$ of ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: IOS distinctly greater than EH.

Central keel: short. Setae on compound eyes: absent. Sculpture of vertex: rugose. Sculpture of postgena behind outer orbit: weakly striate; striate-granulate. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: as wide as long.

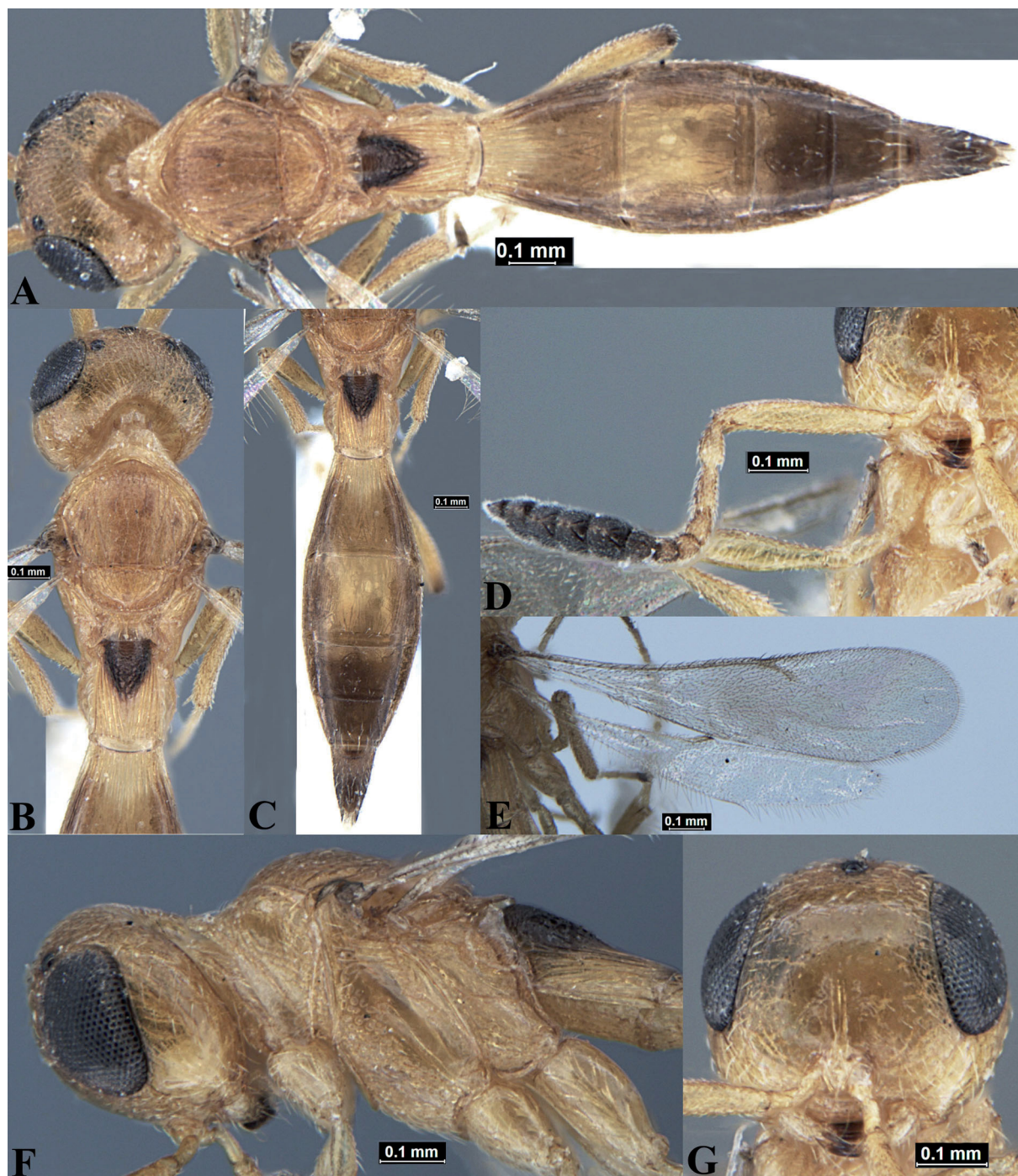


Fig. 1. *Calliscelio abbakkae* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5386). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antenna. **E.** Wings. **F.** Head and pleura. **G.** Frons. Scale bars = 0.1 mm.

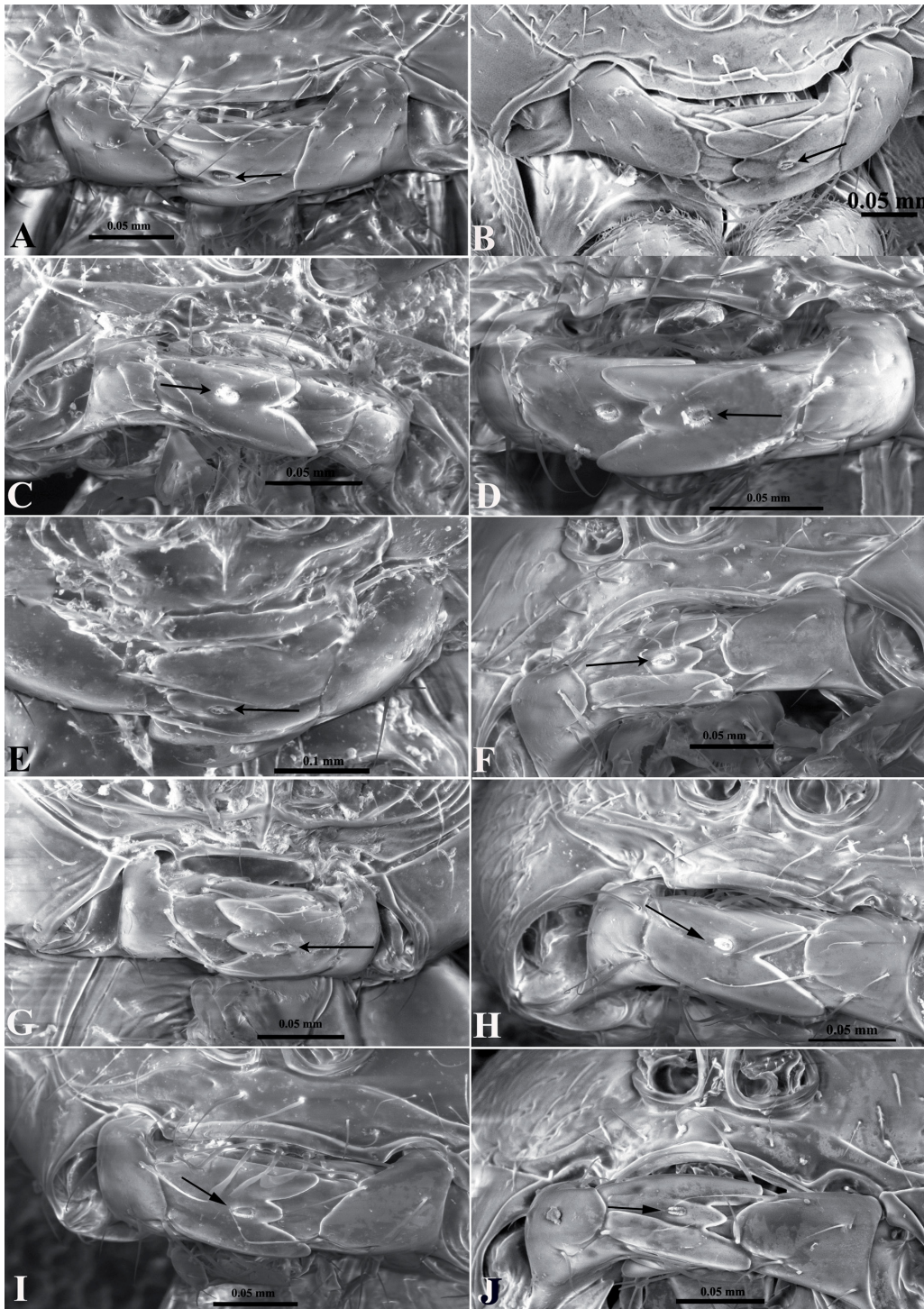


Fig. 2. Mandibles showing prioniform sensillum, ♀♀. **A.** *Calliscelio abbakkae* Veenakumari sp. nov., paratype (NIM/NBAIR P5387). **B.** *C. agaliensis* Narendran & Ramesh Babu, 1999 (NIM/NBAIR P5234). **C.** *C. brennanae* Veenakumari sp. nov., paratype (NIM/NBAIR P5267). **D.** *C. elegans* (Perkins, 1910) (NIM/NBAIR P5311). **E.** *C. glabratus* Rajmohana, 2014 (NIM/NBAIR P5371). **F.** *C. gulika* Veenakumari sp. nov., paratype (NIM/NBAIR P5251). **G.** *C. heramba* Veenakumari sp. nov., paratype (NIM/NBAIR P5443). **H.** *C. indicus* Narendran & Ramesh Babu, 1999 (NIM/NBAIR P5287). **I.** *C. kaliya* Veenakumari sp. nov., paratype (NIM/NBAIR P5364). **J.** *C. longicarinatus* Narendran & Ramesh Babu, 1999 (NIM/NBAIR P5406). Scale bars = 0.05 mm.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: reticulate. Anterior margin of mesoscutum: almost rounded. Setation on mesoscutum: dense. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: reticulate. Setation on mesoscutellum: dense. Scutoscutellar sulcus between notauli: with incomplete foveae. Sculpture of metascutellum: anteriorly rugose, remainder smooth, transparent with sparse longitudinal carinae. Shape of metascutellum: posterior margin rounded, extending onto horn of T1, about $2.5 \times$ as wide as long. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: sparse. Sculpture of dorsal pronotal area: weakly rugose. Sculpture of lateral pronotal area: smooth to weakly rugose, with several oblique carinae towards anterior margin. Epomial carina: absent. Sculpture of netrion: rugose. Transverse carinae in dorsal mesopleuron: dense. Mesopleural carina: present, extending to mesopleural pit. Mesepimeral sulcus: not foveate. Sculpture of ventral mesopleuron: entirely foveate. Sculpture of dorsal metapleural area: weakly rugose. Sculpture of ventral metapleural area: foveate with a smooth area posterodorsally. Sculpture of hind coxa: smooth with sparse striae. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline with an uneven weak black band present medially; entire wing hyaline without black patch. Basalis: absent. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis longer than stigmalis. Setae on submarginalis: short, erect, not exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: large and distinct. Relative widths of T1 horn and T1:T1 wider than horn. Sculpture of horn on T1 dorsally: anteriorly transversely striate, posteriorly rugose. Sculpture of T1 excluding horn: longitudinally carinate, posteriorly smooth. Sculpture of T2: smooth with anteromedial longitudinal carinae extending beyond half the length of tergite, laterally longitudinally carinate, carinae extending entire length of tergite. Sculpture of T3: medially smooth, laterally with longitudinal carinae extending entire length of tergite. Relative lengths of T2/T3: T2 slightly longer than T3. Sculpture of T4: smooth; laterally with short longitudinal carinae. Sculpture of T6: smooth. Shape of T6: $1.5 \times$ as long as wide. Sculpture of S3: smooth.

Male

Unknown.

Calliscelio agaliensis Narendran & Ramesh Babu, 1999

Figs 2B, 3–4

Calliscelio agaliensis Narendran & Ramesh Babu, 1999: 2.

Calliscelio agaliensis – Rajmohana 2006: 120; 2014: 11. — Rajmohana & Peter 2012: 76.

Diagnosis

Calliscelio agaliensis is similar to *C. obavvae* sp. nov. but can be distinguished from it by the presence of densely foveate ventral mesopleuron and ventral metapleural area; and T6 is subequal in length and width. In *C. obavvae* the ventral metapleural area is smooth with oblique carinae, the ventral mesopleuron is smooth and T6 is longer than wide.

Material examined

Paratype

INDIA – Kerala • 1 ♀; Anappady; 7 May 1989; leg. Narendran and Co.; ZSI RB 252, 13444/H3.

Other material examined

INDIA – **Karnataka** • 2 ♀♀; Bengaluru, Jarakabande Kaval; 13°05'41" N, 77°32'35" E; elev. 921 m; 6 Jul. 2015; MT; NIM/NBAIR P5234, P5238 • 1 ♀; same data as for preceding; 7 Nov. 2013; MT; NIM/NBAIR P5236 • 1 ♀; same data as for preceding; 11 Apr. 2014; MT; NIM/NBAIR P5237 • 1 ♀; same data as for preceding; 5 Sep. 2013; MT; NIM/NBAIR P5241 • 1 ♀; same data as for preceding; 7 Jul. 2014; YPT; NIM/NBAIR P5242 • 1 ♀; same data as for preceding; 27 Sep. 2015; YPT; NIM/NBAIR P5244 • 1 ♀; same data as for preceding; 1 Oct. 2014; MT; NIM/NBAIR P5248 • 1 ♀; same data as for preceding; 16 Sep. 2014; MT; NIM/NBAIR P5249 • 1 ♀; Bengaluru, Hesaraghatta; 13°08'01" N, 77°29'27" E; elev. 859 m; 7 Jul. 2014; YPT; NIM/NBAIR P5235 • 1 ♀; same data as for preceding; 28 May 2010; SN; NIM/NBAIR P5246 • 2 ♀♀; same data as for preceding; 23 Jun. 2015; SN; NIM/NBAIR P5240, P5243 • 1 ♀; Bengaluru, Gandhi Krishi Vigyan Kendra (GKVK); 13°04'25" N, 77°34'49" E; elev. 938 m; 11 Aug. 2011; SN; NIM/NBAIR P5239 • 1 ♀; Bengaluru, Hebbal, National Bureau of Agricultural Insect Resources (NBAIR); 13°01'38" N, 77°35'03" E; elev. 927 m; 7 Oct. 2013; YPT; NIM/NBAIR P5245 • 1 ♀; same data as for preceding; 26 Nov. 2011; MT; NIM/NBAIR P5256 • 1 ♀; Bengaluru, Attur; 13°05'48" N, 77°33'59" E; elev. 936 m; 7 May 2013; YPT; NIM/NBAIR P5247 • 1 ♀; Chikkaballapur, Nandi Hills; 13°37'02" N, 77°41'34" E; elev. 1448 m; 19 May 2011; SN; NIM/NBAIR P5250 • 1 ♀; same data as for preceding; 4 Aug. 2011; SN; NIM/NBAIR P5251 • 1 ♀; same data as for preceding; 5 Oct. 2010; SN; NIM/NBAIR P5252 • 1 ♀; Kalaburagi, University of Agricultural Sciences (UAS); 17°21'32" N, 76°48'10" E; elev. 484 m; 5 Jul. 2014; SN; NIM/NBAIR P5253 • 1 ♀; Ramanagara, Kanakapura, Sangama; 12°17'19" N, 77°25'55" E; elev. 484 m; 7 Jul. 2015; SN; NIM/NBAIR P5254 • 1 ♀; Mudigere, College of Horticulture; 13°06'54" N, 75°37'57" E; elev. 976 m; 16 May 2015; light trap; NIM/NBAIR P5255. – **Tamil Nadu** • 2 ♀♀; Yercaud, Horticulture Research Station (HRS); 11°47'44" N, 78°12'42" E; elev. 1399 m; 4–8 Aug. 2016; YPT; NIM/NBAIR P5257 • 1 ♀; same data as for preceding; 6 Aug. 2016; MT; NIM/NBAIR P5259.

Description**Female**

MEASUREMENTS. Body length: 1.95–2.96 mm (n = 10).

COLOUR. Head: yellow-brown; orange; yellow. Mesosoma: yellow-brown; orange; yellow. Horn on T1: black-brown. T1: yellow-brown; orange; black-brown. T2: anteriorly brown, remainder black-brown. T3–T6: black-brown. Antenna: radicle, A1–A5 orange-brown, A6 dark brown, remaining antennomeres black-brown. Legs: orange-brown; yellow.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: rugose with sparse setigerous punctae. Sculpture of ventrolateral frons: rugose. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: short and sparse. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: less than $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH and IOS subequal. Central keel: absent. Setae on compound eyes: absent. Sculpture of vertex: rugose. Sculpture of postgena behind outer orbit: rugose; coriaceous reticulate. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: distinctly shorter than A3. Length of A5: half the length of A3. Shape of A6: slightly wider than long.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: rugose. Anterior margin of mesoscutum: rounded. Setation on mesoscutum: dense. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: weakly rugose. Setation on mesoscutellum: dense. Scutoscuteellar sulcus between notauli: not foveate. Sculpture of metascutellum: anteriorly with two rows of foveae, posteriorly semitransparent with weak transverse striae and longitudinal carinae; posteriorly entirely transparent with longitudinal carinae. Shape of metascutellum: posterior margin rounded,

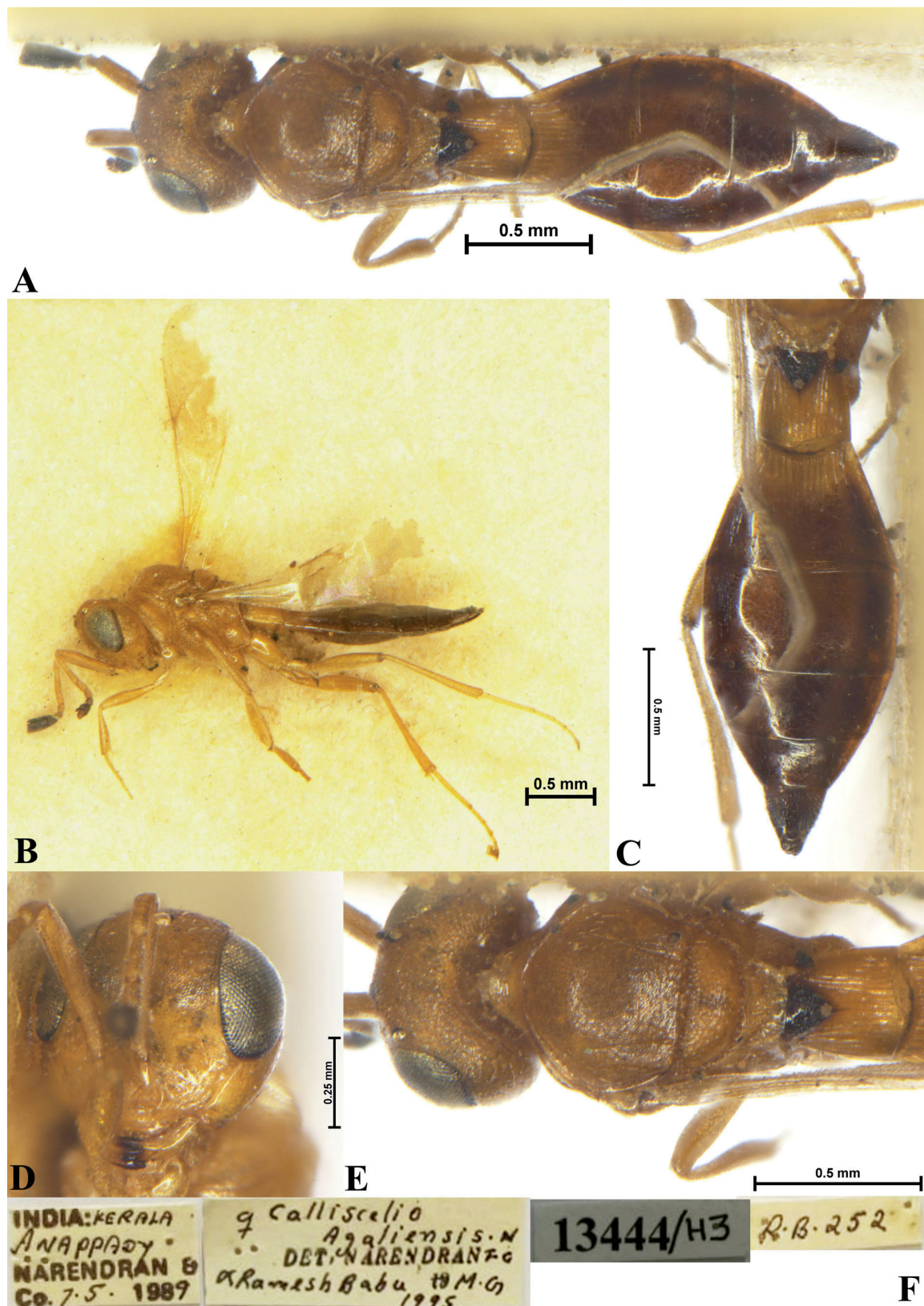


Fig. 3. *Calliscelio agaliensis* Narendran & Ramesh Babu, 1999, paratype, ♀ (ZSI R.B. 252, 13444/H3). A. Habitus, dorsal view. B. Habitus, lateral view. C. Metasoma. D. Frons. E. Head and mesosoma. F. Type labels. Photos: ©ZSI, Kolkata, A. Rameshkumar.

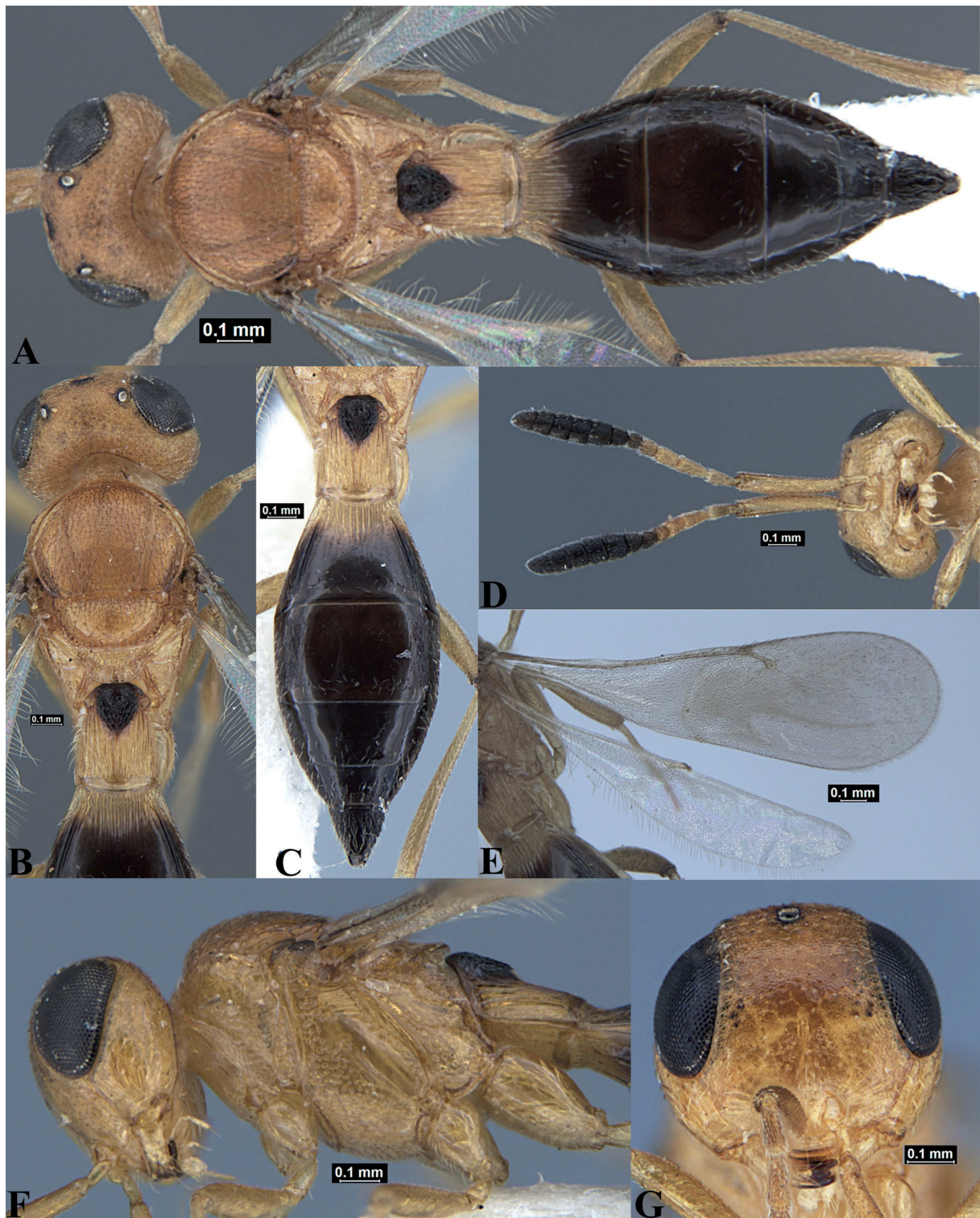


Fig. 4. *Calliscelio agaliensis* Narendran & Ramesh Babu, 1999, ♀ (NIM/NBAIR P5234). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antennae. **E.** Wings. **F.** Head and pleura. **G.** Frons. Scale bars = 0.1 mm.

approximately $2.5 \times$ as wide as long, extending onto horn of T1. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: sparse. Sculpture of dorsal pronotal area: unevenly sculptured. Sculpture of lateral pronotal area: dorsally largely smooth, ventrally smooth-punctate. Epomial carina: absent. Sculpture of netrion: with weak small foveae. Transverse carinae in dorsal mesopleuron: dense. Mesepimeral sulcus: dorsally foveate and ventrally indicated as a carina. Mesopleural carina: present, extending to mesopleural pit. Sculpture of ventral mesopleuron: densely foveate. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: weakly foveate. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: generally weakly infusate in distal $\frac{3}{4}$, without distinct black bands. Basalis: nebulous. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: subequal. Setae on submarginalis: short not exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: present as a small bulge. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1 dorsally: anteriorly rugose with a single V-shaped carina posteriorly; anteriorly rugose and posteriorly with two V-shaped carinae interspersed with uneven depressions. Sculpture of T1 excluding horn: longitudinally carinate, posteriorly smooth. Sculpture of T2: smooth with anteromedial longitudinal carinae extending around half the length of tergite, in addition to sublateral longitudinal carinae extending the entire length of tergite. Sculpture of T3: smooth, with dense, sublateral short longitudinal carinae. Relative lengths of T2/T3: subequal. Sculpture of T4: smooth, with sparse, short longitudinal carinae sublaterally. Sculpture of T6: with dense setigerous punctae except for smooth area anteromedially. Shape of T6: almost as long as wide. Sculpture of S3: smooth.

Male

Unknown.

Remarks

Type in ZSI, Kolkata.

Calliscelio brennanae Veenakumari sp. nov.

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Figs 2C, 5

Diagnosis

Calliscelio brennanae sp. nov. is similar to *C. indicus* but differs from it in having IOS distinctly greater than EH, and the metascutellum is with granular sculpture and the horn on T1 is anteriorly reticulate. In *C. indicus*, EH is distinctly greater than IOS, the metascutellum is with a transverse row of round foveae and the horn on T1 is transversely striate anteriorly. *Calliscelio brennanae* is similar to *C. safavii* Popovici & Talamas, 2024, but differs from it in having IOS distinctly greater than EH and with the horn on T1 being dorsally reticulate. In *C. safavii* IOS is subequal to EH and the horn on T1 is transversely carinate dorsally.

Etymology

This species is named ‘*brennanae*’ after Patricia Brennan, the evolutionary biologist who pioneered studies on genital coevolution in vertebrates, and is an indefatigable champion of studies in the basic sciences. The name is treated as a noun in the genitive case.

Material examined

Holotype

INDIA – **Karnataka** • ♀; Mandya; 12°33'51" N, 76°44'01" E; elev. 749 m; 7 Dec. 2016; YPT; NIM/NBAIR P5266.

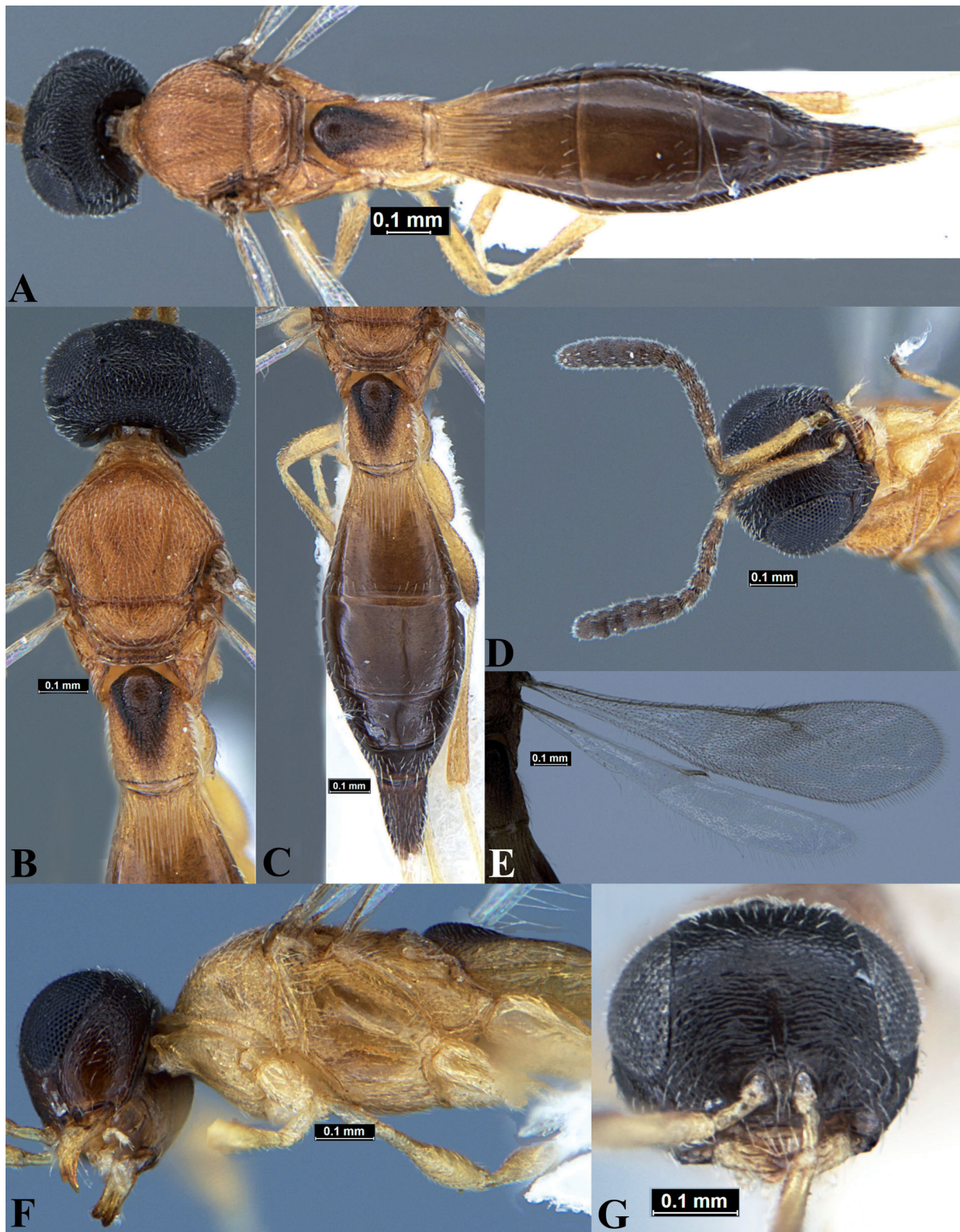


Fig. 5. *Calliscelio brennanae* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5266). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antennae. **E.** Wings. **F.** Head and pleura. **G.** Frons. Scale bars = 0.1 mm.

Paratypes

INDIA – **Karnataka** • 12 ♀♀; same data as holotype; NIM/NBAIR P5267 to P5278. – **Rajasthan** • 4 ♀♀; Ajmer, Tabiji, ICAR-National Research Centre on Seed Spices (NRCSS); 26°21'56" N, 74°35'36" E; elev. 445 m; 21 Sep. 2016; YPT in black gram (*Vigna mungo* (L.) Hepper: Fabaceae) plot; NIM/NBAIR P5279, P5280, P5282, P5459. – **Tamil Nadu** • 4 ♀♀; Yelagiri, Puddur; 12°35'04" N, 78°38'10" E, elev. 1111 m; 17 Jun. 2016; YPT; NIM/NBAIR P5281, P5283 to P5285.

Description

Female

MEASUREMENTS. Body length: 2.30–2.78 mm (n = 10).

COLOUR. Head: black, except red-brown gena. Mesosoma: golden brown; brown; yellow. Horn on T1: red-brown. T1: golden brown; brown with a tinge of black; yellow. T2: anteriorly orange-brown; yellow-brown; yellow. T3: brown. T4–T6: darker than T3. Antenna: radicle, A1 brown, other antennomeres brown-black. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: coriaceous reticulate. Sculpture of ventrolateral frons: medially with discontinuous transverse carinae, coriaceous reticulate towards orbits. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: short and dense. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: IOS greater than EH. Central keel: absent. Setae on compound eyes: present. Sculpture of vertex: coriaceous reticulate. Sculpture of postgena behind outer orbit: coriaceous reticulate. Sculpture of gena: coriaceous reticulate, reticulations effaced basally. Number of teeth on mandible: two, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: as long as wide.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: coriaceous reticulate with a row of small foveae on posterior margin of internotaular area. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: dense. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: coriaceous reticulate. Setation on mesoscutellum: dense. Scutoscuteellar sulcus between notauli: not foveate. Shape of metascutellum: rectangular, posterior margin straight, approximately $5 \times$ as wide as long, not extending onto horn of T1. Sculpture of metascutellum: granulate. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: weakly rugose. Setation of dorsal propodeum: sparse. Sculpture of dorsal pronotal area: unevenly rugose. Sculpture of lateral pronotal area: weakly coriaceous reticulate. Epomial carina: absent. Sculpture of netrion: weakly rugose. Transverse carinae in dorsal mesopleuron: dense. Mesepimeral sulcus: weakly foveate. Mesopleural carina: present, extending up to mesopleural pit. Sculpture of ventral mesopleuron: smooth with sparse foveae. Sculpture of dorsal metapleural area: with short oblique striae. Sculpture of ventral metapleural area: foveate and with a narrow smooth area posterodorsally. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline with a weak oblique dark patch medially. Basalis: absent. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: subequal. Setae on submarginalis: short not exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: large and distinct. Relative widths of T1 horn and T1:T1 wider than horn. Sculpture of horn on T1: dorsally reticulate and laterally carinate. Sculpture of T1 excluding horn: rugose. Sculpture of T2: smooth with anteromedial longitudinal carinae extending half the length of tergite. Sculpture of T3: entirely smooth; smooth with weak reticulations laterally. Relative lengths of T2/

T3: T2 distinctly longer than T3. Sculpture of T4: medially smooth, laterally weakly reticulate. Sculpture of T6: smooth with dense setigerous punctae. Shape of T6: almost $2 \times$ as long as wide. Sculpture of S3: smooth.

Male

Unknown.

Calliscelio carinatus Narendran & Ramesh Babu, 1999

Fig. 6

Calliscelio carinatus Narendran & Ramesh Babu, 1999: 2, 4.

Calliscelio carinatus – Rajmohana 2006: 120–121.

Diagnosis

Calliscelio carinatus is similar to *C. indicus*. It differs from the latter species by the presence of a transverse carina beneath the median ocellus and uninterrupted transverse carinae on the ventral frons on either side of the central keel. In *C. indicus* the transverse carina beneath the median ocellus is absent, and the transverse carinae on the ventral frons are interrupted medially by a smooth band; while the central keel is absent.

Material examined

Paratype

INDIA – **Kerala** • 1 ♀; C.U. (Calicut University) Campus; May 1988; Narendran and party leg.; ZSI RB 60, 13442/H3.

Description

Female

MEASUREMENTS. Body length: 2.63 mm.

COLOUR. Head: black. Mesosoma: black with red-brown pleuron. Horn on T1: black-brown. T1: red-brown. T2–T3: red-brown. T4–T6: brown-black. Antenna: radicle, A1 yellow-brown, A2–A6 brown-black, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: granulate. Sculpture of ventrolateral frons: with uninterrupted transverse carinae and coriaceous reticulate towards orbits. Striae on lower frons: absent. Frontal carina below median ocellus: a discontinuous carina present. Setation of upper frons: short and dense. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: IOS and EH subequal. Central keel: present. Setae on compound eyes: absent. Sculpture of vertex: granulate. Sculpture of postgena behind outer orbit: rugose. Sculpture of gena: granulate and smooth posteriorly. Number of teeth on mandible: two, subequal in size. Length of A2: longer than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: wider than long.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: granulate. Anterior margin of mesoscutum: rounded. Setation on mesoscutum: sparse. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: laterally coriaceous reticulate, reticulations transverse (medial sculpture not visible, indistinct). Setation on mesoscutellum: sparse. Scutoscuteellar sulcus between notauli: not foveate. Shape of metascutellum: rectangular, posterior margin straight, not extending onto horn of T1. Sculpture of metascutellum: granulate. Dorsal propodeum: excavate medially,

with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: sparse. Transverse carinae on dorsal mesopleuron: dense. Mesepimeral sulcus: foveate. Mesopleural carina: present. Sculpture of ventral mesopleuron: entirely foveate. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: foveate and with a narrow smooth area posterodorsally.

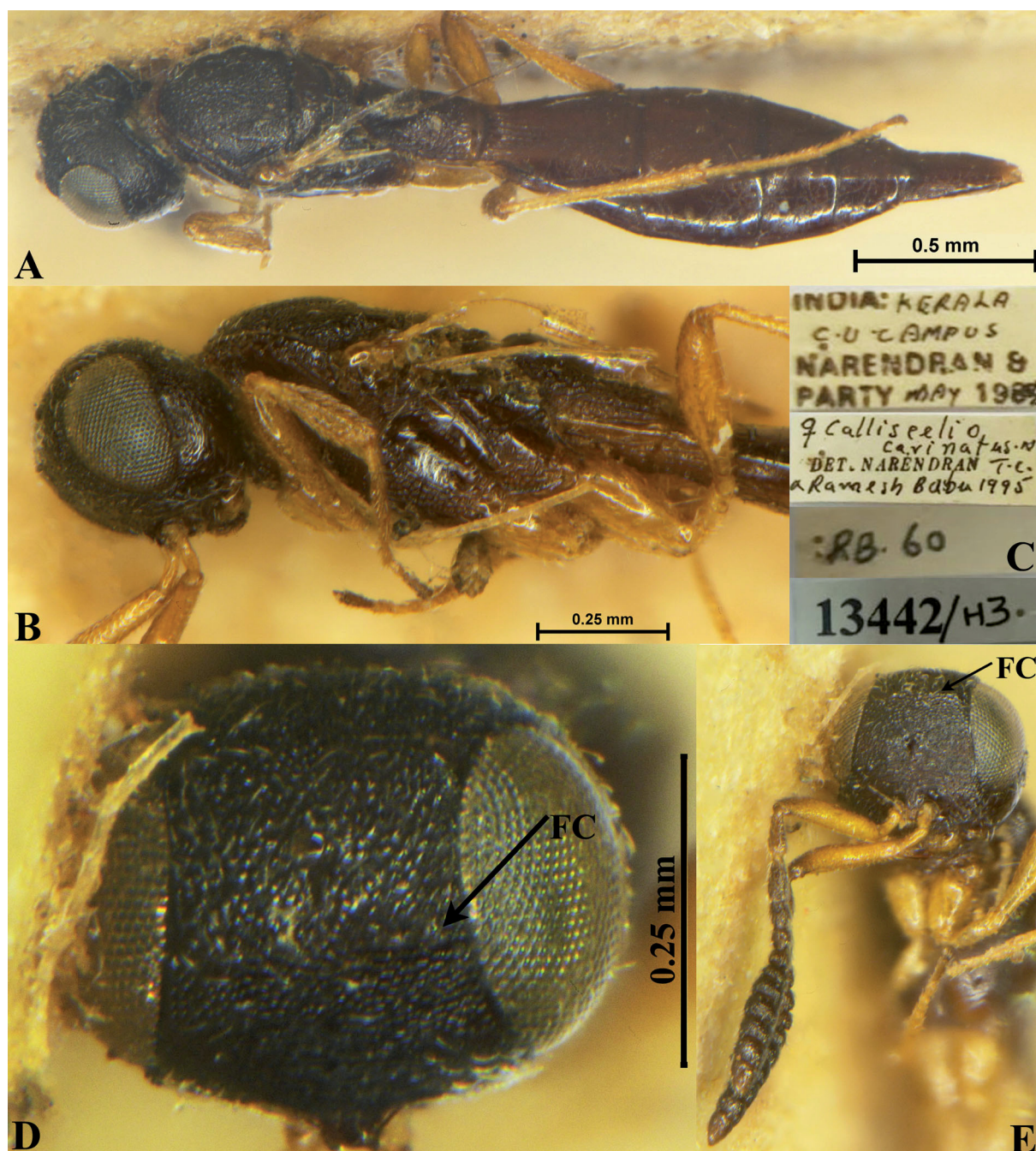


Fig. 6. *Calliscelio carinatus* Narendran & Ramesh Babu, 1999, paratype, ♀ (ZSI RB. 60, 13442/H3). A. Habitus, dorsal view. B. Head and pleura. C. Type labels. D. Frons (FC = frontal carina). E. Head and antennae. Photos: ©ZSI, Kolkata, A. Rameshkumar.

METASOMA. Horn on T1 in female: present as a small bulge. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of T1 excluding horn: rugose. Sculpture of T2: smooth with anteromedial longitudinal carinae extending half the length of tergite. Sculpture of T3: entirely smooth. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: smooth. Sculpture of T6: anteriorly 1/3 striate, remainder smooth. Shape of T6: almost 2 × as long as wide.

Male

Unknown.

Remarks

Type in ZSI, Kolkata.

Calliscelio coorgensis Sharma, 1982

Fig. 7

Calliscelio coorgensis Sharma, 1982: 321.

Calliscelio coorgensis – Narendran & Ramesh Babu 1999: 2. — Rajmohana 2006: 120.

Diagnosis

Calliscelio coorgensis is similar to *C. ulupi* sp. nov. and *C. rugosus* but differs from both, by the absence of foveae on scutoscuteellar sulcus and EH being subequal to IOS. In *C. ulupi* and *C. rugosus* EH is distinctly greater than IOS and scutoscuteellar sulcus is distinctly foveate. *Calliscelio coorgensis* is also similar to *C. philippinensis* but differs from it by the presence of dense setae on rugose frons; while in the latter species the frons is smooth with sparse setae.

Material examined

Holotype

INDIA – **Kerala** • ♂; Walayar Forest; 9–11 May 1976; M.S. Mani and party leg.; USNM USNMMENT 01197120.

Other material examined

INDIA – **Karnataka** • 1 ♂; Bengaluru, Attur; 13°05'48" N, 77°33'59" E; elev. 936 m; 12 Jul. 2013; MT; NIM/NBAIR P5415 • 1 ♂; Bengaluru, Hesaraghatta; 13°08'01" N, 77°29'27" E; elev. 859 m; 28 May 2010; SN; NIM/NBAIR P5479. – **Tamil Nadu** • 1 ♂; Yelagiri, Puddur; 12°35'04" N, 78°38'10" E, elev. 1111 m; 18 Jun. 2016; YPT; NIM/NBAIR P5416.

Description

Male

MEASUREMENTS. Body length of male: 3.20 mm.

COLOUR. Head: red-brown. Mesosoma: red-brown. Metasoma: T1–T4 orange-brown, remaining tergites black brown. Antenna: radicle, A1–A2 orange-brown, remaining tergites black-brown. Legs: all legs red-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: weakly rugose. Sculpture of ventrolateral frons: weakly rugose with several sparse oblique carinae on either side on scrobe. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: sparse and long. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: less than 0.5 × ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: IOS greater than EH. Central keel: absent.

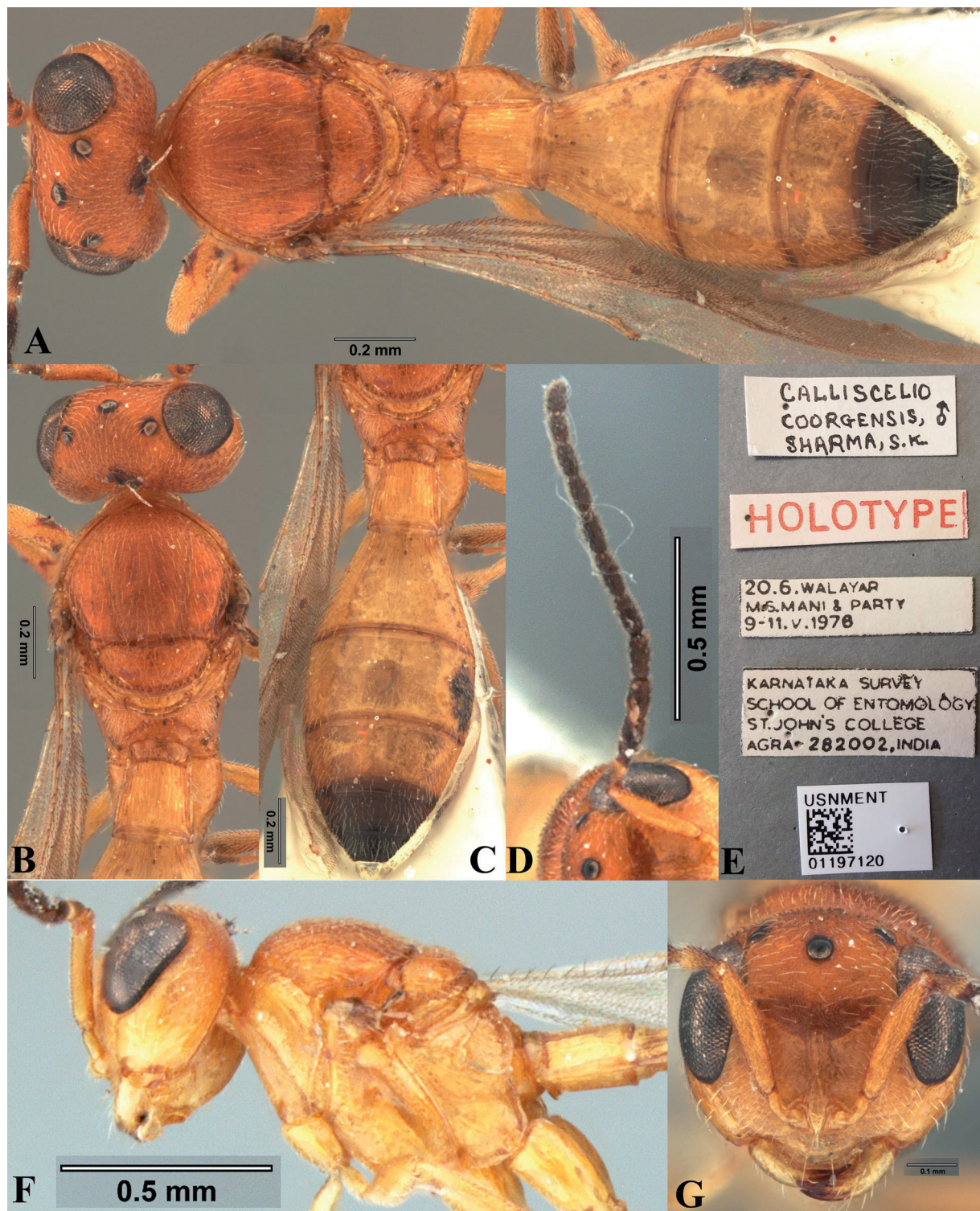


Fig. 7. *Calliscelio coorgensis* Sharma, 1982, holotype, ♂ (USNM USNM01197120). A. Habitus, dorsal view. B. Head and mesosoma. C. Metasoma. D. Antenna. E. Type labels. F. Head and pleura. G. Frons. Photos: ©USNM, N.F. Johnson.

Setae on compound eyes: absent. Sculpture of vertex: rugose. Sculpture of postgena behind outer orbit: smooth to rugose. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of antennomeres A3–A8: approximately $2.5 \times$ as long as wide, A9–A11: approximately $2.3 \times$ as long as wide.

MESOSOMA. Shape of mesoscutum: wider than long. Sculpture of mesoscutum: rugose-punctate. Anterior margin of mesoscutum: rounded. Setation on mesoscutum: dense. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: rugose-punctate. Setation on mesoscutellum: dense. Scutoscuteellar sulcus between notauli: not foveate. Sculpture of metascutellum: weakly rugose, with a curved carina on posterior margin. Shape of metascutellum: posterior margin rounded $3 \times$ as wide as long, extending onto anterior dorsal propodeum. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: dense. Sculpture of lateral pronotal area: smooth to weakly rugose. Epomial carina: absent. Sculpture of netrion: rugose. Transverse carinae in dorsal mesopleuron: sparse. Mesopleural carina: present, short, not extending up to mesopleural pit. Mesepimeral sulcus: weakly foveate. Sculpture of ventral mesopleuron: smooth. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: foveate, with smooth area posterodorsally. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline. Basalis: absent. Length of marginalis: distinctly shorter than postmarginalis and stigmatis. Relative lengths of postmarginalis and stigmatis: postmarginalis longer than stigmatis. Setae on submarginalis: short, not exceeding the anterior margin of wing.

METASOMA. Sculpture of T1: longitudinally carinate, posteriorly smooth. Sculpture of T2: smooth except for longitudinal carinae on anterior margin, anteromedial and anterolateral carinae extending entire length of tergite. Sculpture of T3: smooth, with dense setigerous punctae laterally. Sculpture of T4: setigerous punctate. Sculpture of T6: smooth with dense setigerous punctae. Relative lengths of T2/T3: T2 slightly longer than T3. Sculpture of S3: smooth.

Female

Unknown.

Remarks

Type in USNM.

***Calliscelio coromandelensis* Sharma, 1978**

Calliscelio coromandelensis Sharma in Saraswat & Sharma, 1978: 32.

Calliscelio coromandelensis – Mani & Sharma 1982: 179. — Narendran & Ramesh Babu 1999: 2. — Rajmohana 2006: 120.

Description

See Saraswat & Sharma (1978) and Mani & Sharma (1982).

Remarks

Presence of a bidentate metascutellum indicates that this species does not belong to *Calliscelio*; hence this it excluded from the key.

The holotype of *C. coromandelensis* is mounted on a glass slide. Images were not available for study.

Type in USNM.

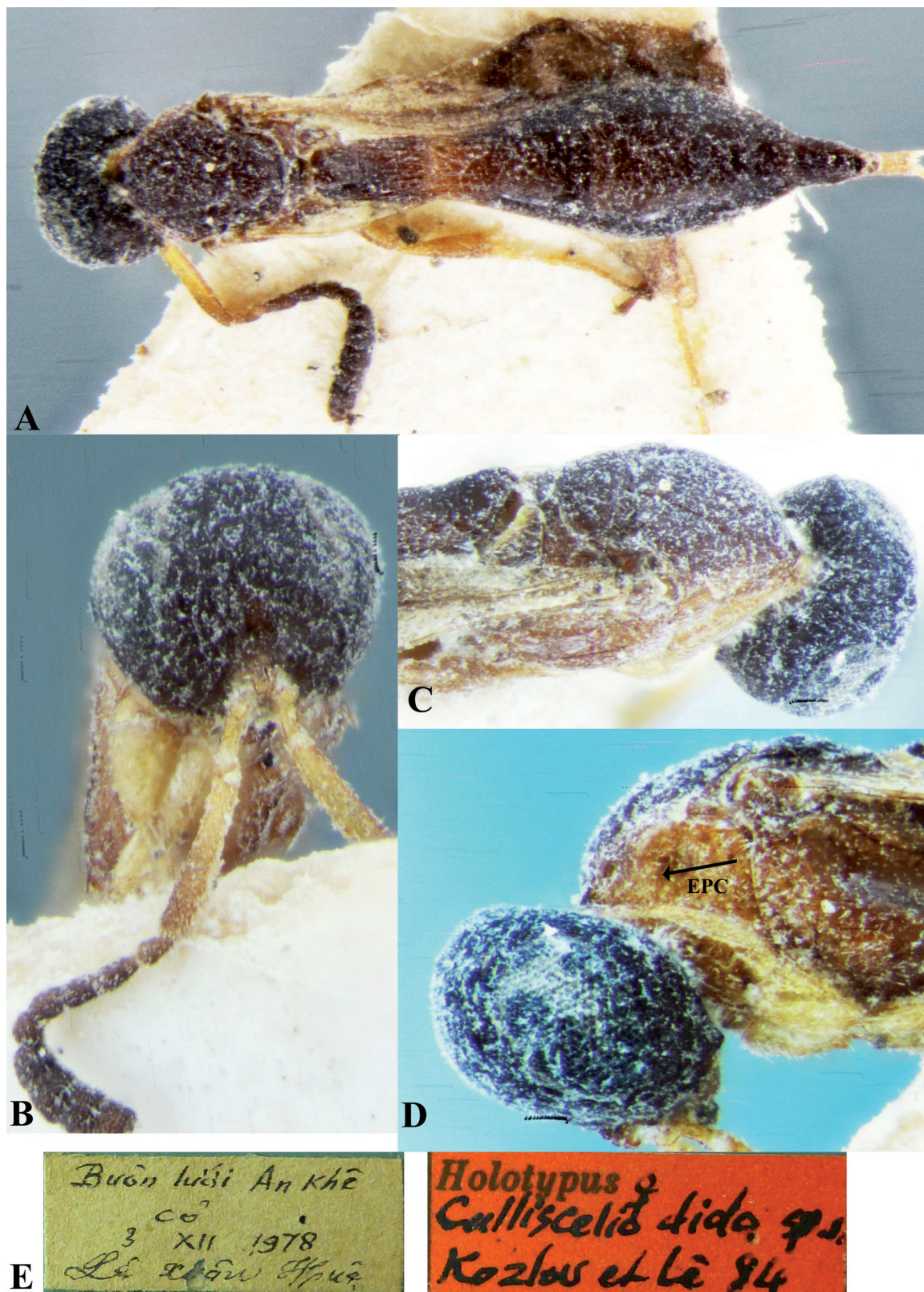


Fig. 8. *Calliscelio dido* Kozlov & Lê, 2000, holotype, ♀ (IEBR). **A.** Habitus, dorsal view. **B.** Frons and antenna. **C.** Head and mesosoma. **D.** Head and lateral pronotal area showing epomial carina (EPC). **E.** Type labels. Photos: ©USNM, N.F. Johnson and E.J. Talamas.

Calliscelio dido Kozlov & Lê, 2000

Fig. 8

Calliscelio dido Kozlov & Lê, 2000: 47.

Diagnosis

Calliscelio dido is similar to *C. kaliya* sp. nov. but differs from it in having IOS subequal to EH, and with the interantennal process being elongate and smooth with a median longitudinal groove. In *C. kaliya* EH is distinctly greater than IOS, and the interantennal process is as long as wide with rugose sculpture.

Material examined

Holotype

VIETNAM – Gia Lai • ♀; An Khe, Buon Luoi; 13 Dec. 1978; X.H. Lê leg.; IEBR.

Description

See Lê (2000) for description.

Remarks

Type in IEBR.

Calliscelio elegans (Perkins, 1910)

Figs 2D, 9, 10A, 11A

Caloteleia elegans Perkins, 1910: 624 (original description)

Calotelea tanugatra Narendran, 1998: 71 (original description, keyed).

Caenoteleia elegans – Kieffer 1926: 550 (generic transfer, description).

Calotelea tanugatra – Rajmohana 2006: 122–123. — Rajmohana *et al.* 2013: 8 (junior synonym of *Calliscelio elegans* (Perkins), type information).

Calliscelio elegans – Masner *et al.* 2009: 61 (generic transfer). — Chen *et al.* 2017: 13, 16, 57.

Diagnosis

This species is similar to *C. sundari* sp. nov. but can be distinguished from it by the presence of a dorsally rounded horn on T1 which is narrower than the posterior width of T1, while the hind coxa and A3–A7 are yellow-brown. In *C. sundari* the horn on T1 is anteriorly truncate and it is almost as wide as the posterior width of T1; and the hind coxa and A3–A7 are white.

Material examined

INDIA – **Arunachal Pradesh** • 1 ♀; Pasighat, College of Horticulture and Forestry (CHF); 28°04'28" N, 95°19'28" E; elev. 173 m; 3 May 2014; SN; NIM/NBAIR P5323 • 1 ♀; same data as for preceding; 11 Nov. 2014; YPT; NIM/NBAIR P5324 • 1 ♀; same data as for preceding; 3 May 2014; NIM/NBAIR P5325. – **Karnataka** • 3 ♀♀; Bengaluru, Kengeri; 12°57'25" N, 77°31'39" E; elev. 857 m; 19 Apr. 2017; YPT; NIM/NBAIR P5311 to P5313 • 1 ♀; Chikkaballapur, Nandi Hills; 13°37'02" N, 77°41'34" E; elev. 1448 m; 25 Jun. 2011; SN; NIM/NBAIR P5314 • 1 ♀; same data as for preceding; 1 May 2015; YPT; NIM/NBAIR P5315 • 1 ♀; Mandya; 12°33'51" N, 76°44'01" E; elev. 749 m; 7 Dec. 2016; YPT; NIM/NBAIR P5316 • 1 ♀; Udupi, Brahmavara; 13°25'51" N, 74°44'43" E; elev. 36 m; 28 May 2014; YPT; NIM/NBAIR P5317 • 1 ♀; Bidar, Krishi Vigyan Kendra (KVK); 17°59'08" N, 77°29'03" E; elev. 580 m; 11 Aug. 2012; MT; NIM/NBAIR P5318 • 2 ♂♂; Chikkaballapur, Nandi Hills; 13°37'02" N, 77°41'34" E; elev. 1448 m; 28 Jun. 2011; SN; NIM/NBAIR P5326, P5327 • 1 ♂; Bengaluru, Kengeri; 12°57'25" N, 77°31'39" E; elev. 857 m; 19 Apr. 2017; YPT; NIM/NBAIR P5328. – **Kerala** • 2 ♀♀; Calicut, Indian Institute of Spices Research (IISR); 11°17'55" N, 75°50'25" E; elev. 64 m; 2 Feb. 2017; YPT in grass; NIM/NBAIR P5319, P5320. – **Rajasthan** • 1 ♀; Udaipur, Aaram Bagh; 24°25'01" N,

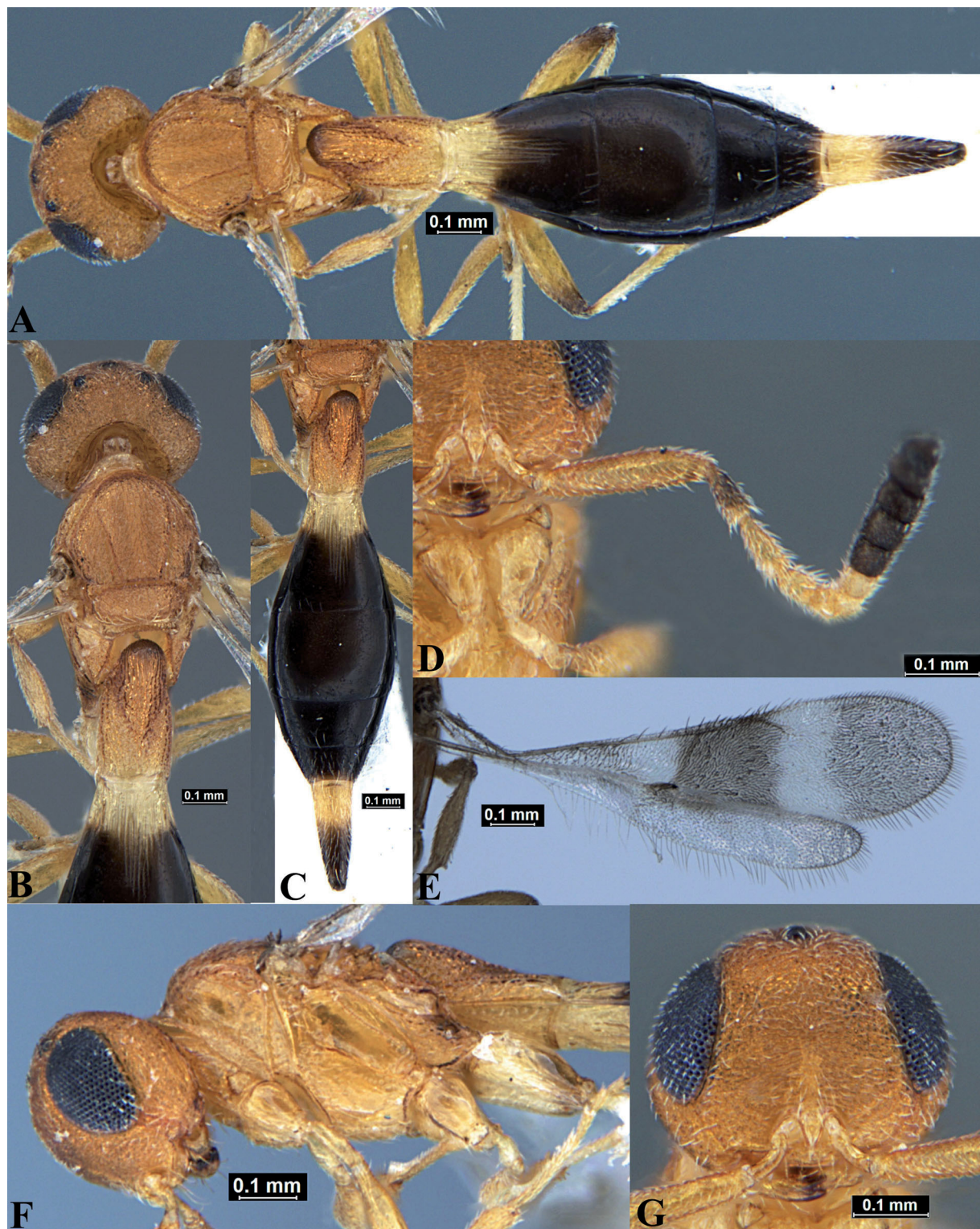


Fig. 9. *Calliscelio elegans* (Perkins, 1910), ♀ (NIM/NBAIR P5311). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antenna. **E.** Wings. **F.** Head and pleura. **G.** Frons. Scale bars = 0.1 mm.

73°38'18" E; elev. 505 m; 23 Sep. 2016; YPT near water; NIM/NBAIR P5322. – **Tamil Nadu** • 1 ♀; Hosur, Uddanapalli; 12°37'28" N, 77°55'29" E; elev. 758 m; 18 Dec. 2014; MT; NIM/NBAIR P5321.

Description

A detailed description of the female was furnished by Masner *et al.* (2009). The male was described later by Rajmohana *et al.* (2013).

Remarks

Type in Bernice P. Bishop Museum, Honolulu (Masner *et al.* 2009).



Fig. 10. Males. **A.** *Calliscelio elegans* (Perkins, 1910), (NIM/NBAIR P5326). **B.** *C. indicus* Narendran & Ramesh Babu, 1999 (NIM/NBAIR P5310). **C.** *C. rugosus* Rajmohana & Peter, 2012 (NIM/NBAIR P5347). **D.** *C. ulupi* Veenakumari sp. nov., paratype (NIM/NBAIR P5441). Scale bars = 0.1 mm.

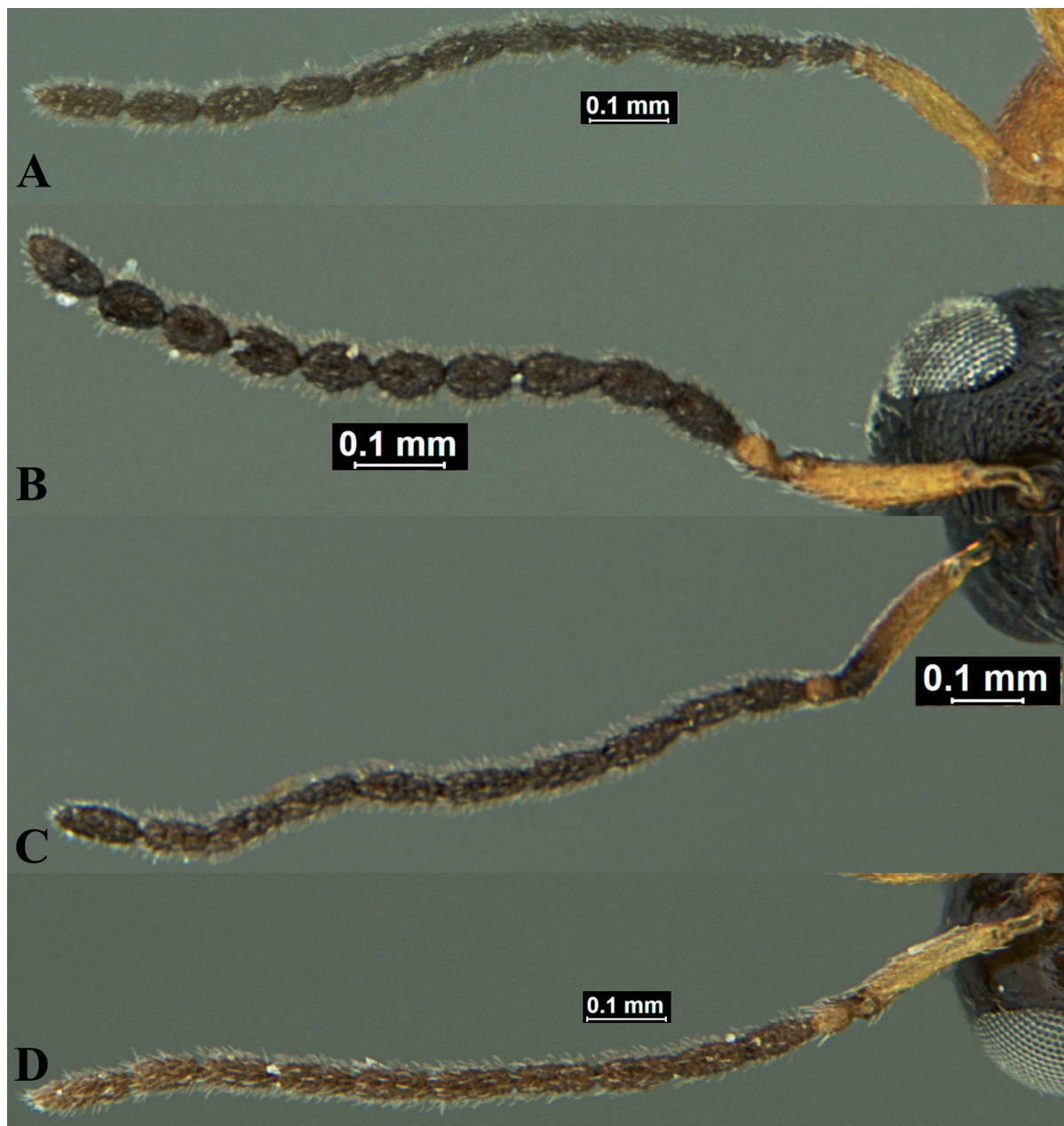


Fig. 11. Antennae of males. **A.** *Calliscelio elegans* (Perkins, 1910), (NIM/NBAIR P5326). **B.** *C. indicus* Narendran & Ramesh Babu, 1999 (NIM/NBAIR P5310). **C.** *C. rugosus* Rajmohana & Peter, 2012 (NIM/NBAIR P5347). **D.** *C. ulupi* Veenakumari sp. nov., paratype (NIM/NBAIR P5441). Scale bars = 0.1 mm.

Calliscelio glabratus Rajmohana, 2014

Figs 2E, 12

Calliscelio glabratus Rajmohana, 2014: 12–13, pl. III figs 19–26.

Diagnosis

Calliscelio glabratus is similar to *C. pinaki* sp. nov. but differs from it in having an elongate T1 and T6, both of which are at least $2\times$ as long as wide and the occipital carina is medially sculptured. In *C. pinaki* T1 and T6 are at most $1.5\times$ as long as wide, while the occipital carina is not sculptured medially.

Material examined

INDIA – **Kerala** • 6 ♀♀; Trivandrum; 8°25'44" N, 76°59'11" E; elev. 36 m; 22 Nov. 2015; YPT; NIM/NBAIR P5371, P5372, P5374 to P5377 • 1 ♀; Trivandrum, Vellayani Kayal; 8°26'03" N, 76°59'30" E; elev. 10 m; 20 Nov. 2015; YPT; NIM/NBAIR P5373 • 1 ♀; Trivandrum, Peringamala; 8°43'42" N, 77°62'48" E; elev. 89 m; 22 Nov. 2015; YPT; NIM/NBAIR P5378. – **Sikkim** • 2 ♀♀; Tadong, ICAR Research Complex for NEH region; 25°41'02" N, 91°54'48" E; elev. 1330 m; 1 Nov. 2014; YPT in rice plot; NIM/NBAIR P5379, P5380. – **West Bengal** • 1 ♀; Raiganj, Tahirpur; 12 Jun. 2008; 25°35'38" N, 88°09'30" E; elev. 40 m; SN; NIM/NBAIR P5381.

Description

Female

MEASUREMENTS. Body length: 2.40–3.05 mm (n = 10).

COLOUR. Head: black. Mesosoma: brown-black, pleuron brown. Horn on T1: black-brown. T1: red-brown. T2: anteriorly yellow-brown, posteriorly brown-black. T3–T6: brown-black. Antenna: radicle, A1–A2 brown with uneven black patches, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: rugose. Sculpture of ventrolateral frons: smooth. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: long and sparse. Hyperoccipital carina: weakly indicated. Occipital carina: interrupted medially. Length of OOL: less than $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH distinctly greater than IOS. Central keel: absent. Setae on compound eyes: short and sparse. Sculpture of vertex: anteriorly coriaceous reticulate, posteriorly smooth with sparse setigerous punctae. Sculpture of postgena behind outer orbit: coriaceous reticulate to smooth. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: wider than long.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: anterior internotal area weakly rugose, remainder smooth. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: dense, setae longer posteriorly. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: entirely smooth. Setation on mesoscutellum: sparse. Scutoscuteellar sulcus between notauli: with incomplete foveae. Sculpture of metascutellum: entirely smooth with sparse foveae dorsolaterally. Shape of metascutellum: rectangular, with posteromedial flap, extending onto horn of T1, about $2.5 \times$ as wide as long. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: dense. Sculpture of dorsal pronotal area: smooth. Sculpture of lateral pronotal area: predominantly smooth, with a row of foveae anteriorly. Epomial carina: absent. Sculpture of netrion: anteriorly with pits, remainder foveate. Transverse carinae in dorsal mesopleuron: dense. Mesopleural carina: present, extending to sternaulus. Mesepimeral sulcus: indicated as foveae dorsally and remainder as a carina. Sculpture of ventral mesopleuron: entirely smooth with foveae dorsally and anteriorly. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: foveate with a smooth area posterodorsally. Sculpture of hind coxa: smooth to uneven sculpture. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline with a weak black band present medially. Basalis: absent. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis more than $2 \times$ as long as stigmalis. Setae on submarginalis: long, erect, exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: present as a small bulge. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1 dorsally: smooth. Sculpture of T1 excluding horn: longitudinally carinate. Sculpture of T2: anteriorly smooth followed by anteromedial longitudinal carinae extending

half the length of tergite, remainder smooth. Sculpture of T3: smooth. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: smooth. Sculpture of T6: smooth. Shape of A6: more than 2 × as long as wide. Sculpture of S3: smooth.

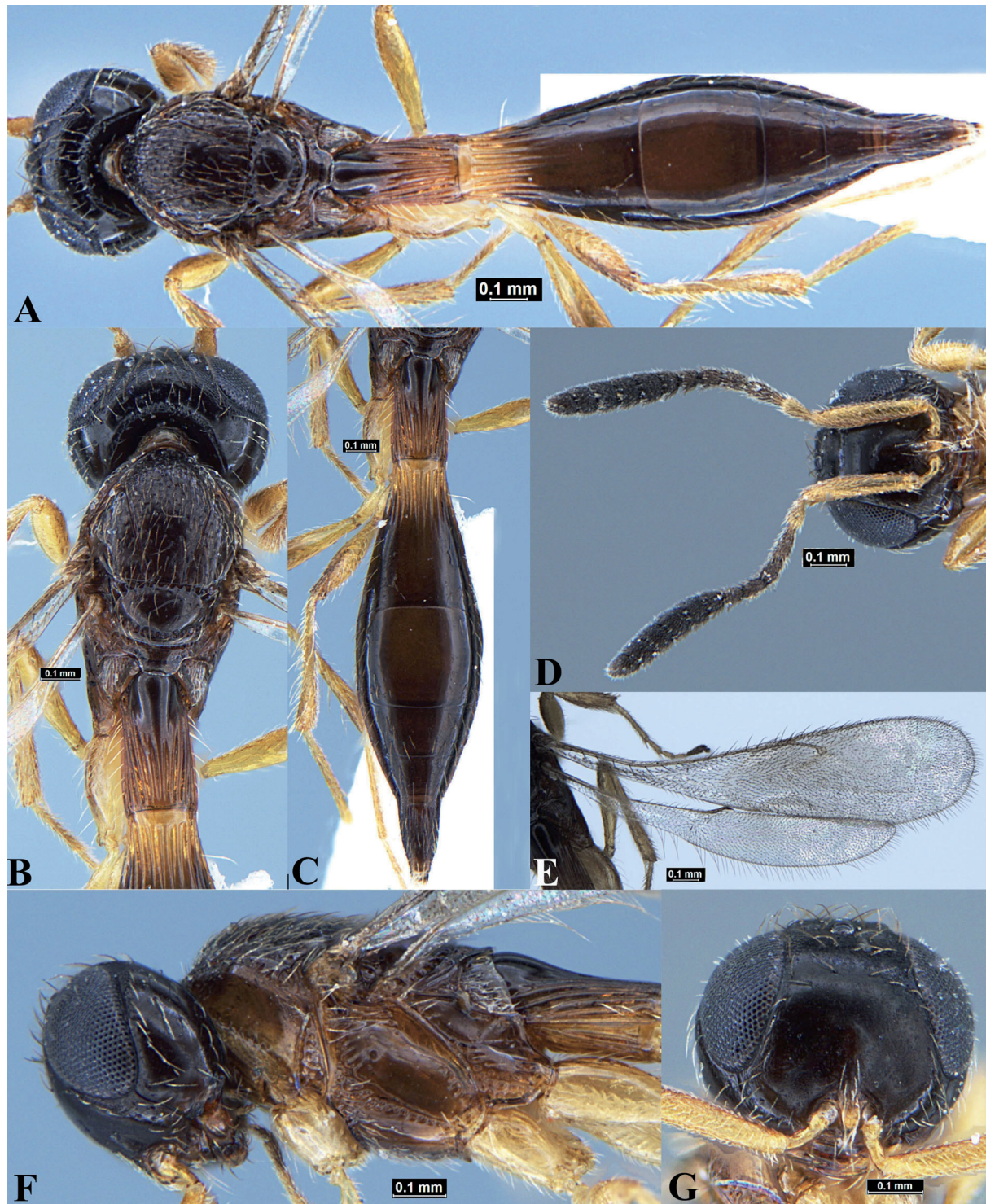


Fig. 12. *Calliscelio glabratus* Rajmohana, 2014, ♀ (NIM/NBAIR P5371). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antennae. **E.** Wings. **F.** Head and pleura. **G.** Frons. Scale bars = 0.1 mm.

Male

Unknown.

Remarks

Type in ZSI, Calicut.

***Calliscelio gulika* Veenakumari sp. nov.**

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Figs 2F, 13

Diagnosis

Calliscelio gulika sp. nov. is distinct in having a posteromedially excavate metascutellum.

Etymology

This species is named after ‘Gulika’, one of seven divine serpents in Hindu mythology, the guardian of medicinal plants with knowledge of healing and antidotes. The name is treated as a noun in apposition.

Material examined

Holotype

INDIA – **Sikkim** • ♀; Tadong, ICAR Research Complex for NEH region; 25°41′02″ N, 91°54′48″ E; elev. 1330 m; 3 Nov. 2014; MT; NIM/NBAIR P5250.

Paratypes

INDIA – **Arunachal Pradesh** • 1 ♀; Mebo circle of East Siang, Ayeng; 28°09′58″ N, 95°24′21″ E; elev. 1330 m; 5 May 2014; SN; NIM/NBAIR P5357. – **Karnataka** • 1 ♀; Dakshina Kannada, Kidu, Central Plantation Crops Research Institute (CPCRI); 12°42′24″ N, 75°34′27″ E; elev. 143 m; 19 Feb. 2015; SN (river bank); NIM/NBAIR P5358. – **Sikkim** • 4 ♀♀; same data as for holotype; NIM/NBAIR P5251 to P5254 • 2 ♀♀; same data as holotype; YPT; NIM/NBAIR P5355, P5356. – **Uttarakhand** • 1 ♀; Roorkee, Chhiddarwala; 29°51′15″ N, 77°53′16″ E; elev. 271 m; 2 Oct. 2009; SN; NIM/NBAIR P5359.

Description

Female

MEASUREMENTS. Body length: 2.36–2.85 mm (n = 10).

COLOUR. Head: black. Mesosoma: mesoscutum, mesoscutellum and metascutellum brown-black, lateral pronotal area, mesopleuron and ventral metapleural area in shades of brown. Horn on T1: black-brown. T1: red-brown. T2: anteriorly light brown, remainder brown-black. T3–T6: brown-black. Antenna: radicle and base of A1 yellow-brown, remainder of A1 and A2 brown, remaining antennomeres black-brown. Legs: brown-yellow.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: entirely smooth. Sculpture of ventrolateral frons: smooth. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: long and sparse. Hyperoccipital carina: weakly indicated. Occipital carina: complete medially. Length of OOL: less than 0.5 × ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH distinctly greater than IOS. Central keel: absent. Setae on compound eyes: absent. Sculpture of vertex: interocellar area smooth, followed by a transverse coriaceous reticulate patch, posteriorly smooth with setigerous punctae. Sculpture of postgena behind outer orbit: foveate. Sculpture of gena: smooth with sparse transverse striae basally. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: almost half length of A3. Shape of A6: as long as wide.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: largely smooth, dense setigerous punctae, except for a small rugose patch present laterally on medial internotaular area. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: dense, with long setae posteriorly.

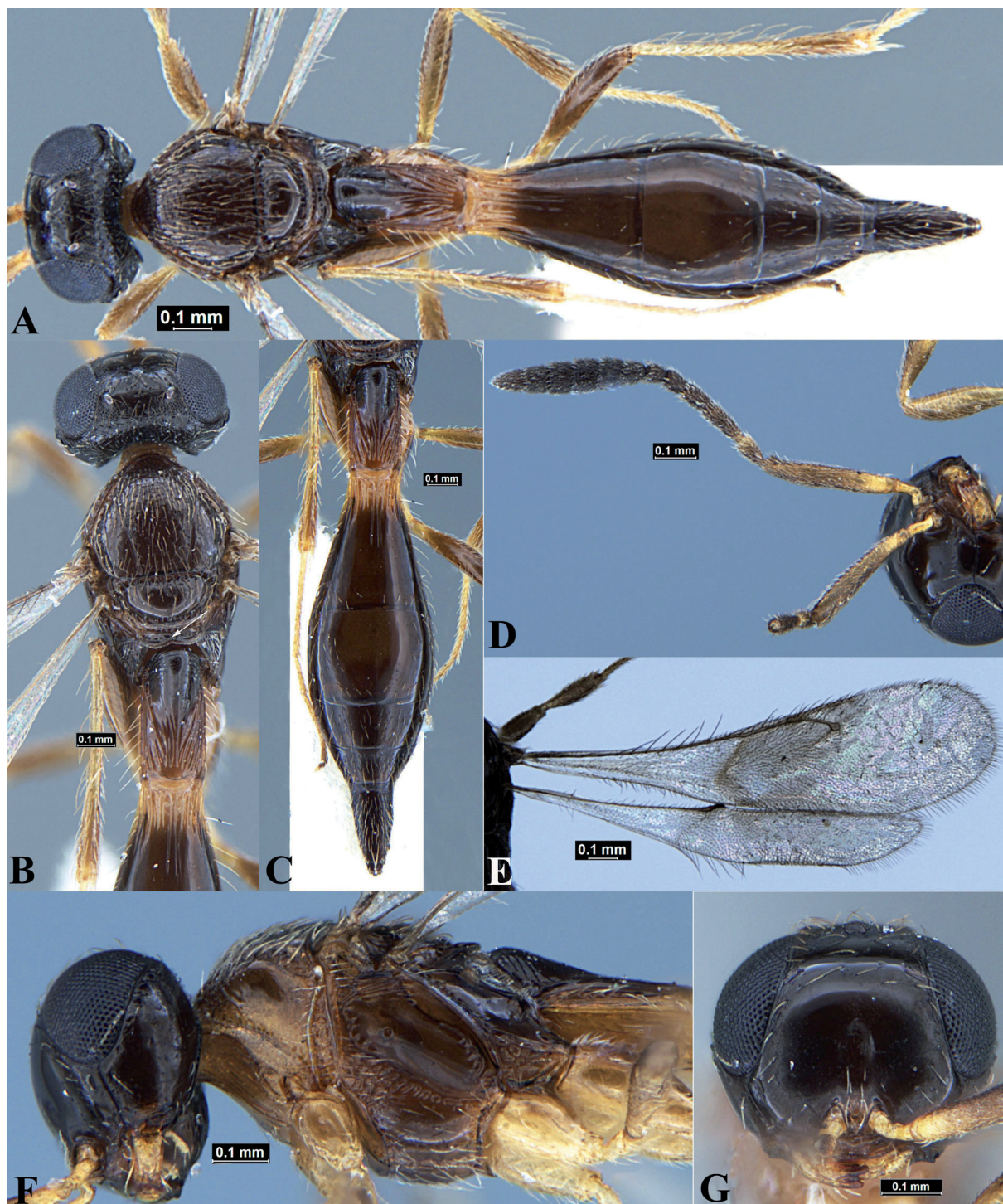


Fig. 13. *Calliscelio gulika* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5250). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antenna. **E.** Wings. **F.** Head and pleura. **G.** Frons. Scale bars = 0.1 mm.

Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: smooth. Setation on mesoscutellum: sparse. Scutoscuteellar sulcus between notauli: with round complete foveae. Sculpture of metascutellum: anteriorly foveate, remainder smooth with a transverse row of foveae medially; weakly rugose. Shape of metascutellum: posterior margin rounded and invaginate medially, $3.6\times$ as wide as long, not extending onto horn of T1. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: dense. Sculpture of dorsal pronotal area: almost smooth. Sculpture of lateral pronotal area: predominantly smooth, with three oblique carinae anterodorsally. Epomial carina: absent. Sculpture of netrion: with shallow uneven depressions. Transverse carinae in dorsal mesopleuron: dense. Mesopleural carina: present, extending up to sternaulus. Mesepimeral sulcus: indicated as a furrow. Sculpture of ventral mesopleuron: anteriorly and dorsally unevenly foveate, remainder smooth. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: foveate, with a narrow smooth area posterodorsally. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline, with a weak black band medially. Basalis: present. Length of marginalis: distinctly shorter than postmarginalis and stigmatis. Relative lengths of postmarginalis and stigmatis: postmarginalis longer than stigmatis. Setae on submarginalis: long, erect, exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: large and distinct. Relative widths of T1 horn and T1: horn almost as wide as T1. Sculpture of horn on T1 dorsally: anteriorly transversely carinate, posteriorly smooth. Sculpture of T1 excluding horn: longitudinally carinate, posteriorly smooth. Sculpture of T2: smooth, with anteromedial longitudinal carinae extending half the length of tergite. Sculpture of T3: smooth. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: smooth. Sculpture of T6: smooth with dense setigerous punctae. Shape of T6: around $2\times$ as long as wide. Sculpture of S3: smooth.

Male

Unknown.

Calliscelio heramba Veenakumari sp. nov.

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Figs 2G, 14

Diagnosis

Calliscelio heramba sp. nov. is distinct in having long, thick, black bristles on the mesoscutum and mesoscutellum and T6 is at least $3\times$ as long as wide.

Etymology

This species is named ‘*heramba*’, one of the many names of the five-headed form of the Hindu god Ganesha. The name is treated as a noun in apposition.

Material examined

Holotype

INDIA – **Andaman and Nicobar Islands** • ♀; Great Nicobar I., Campbell Bay; $7^{\circ}00'27''$ N, $93^{\circ}56'03''$ E; elev. 13 m; 22 Mar. 2016; YPT; NIM/NBAIR P5442.

Paratypes

INDIA – **Andaman and Nicobar Islands** • 5 ♀♀; same data as for holotype; NIM/NBAIR P5443 to 5447.

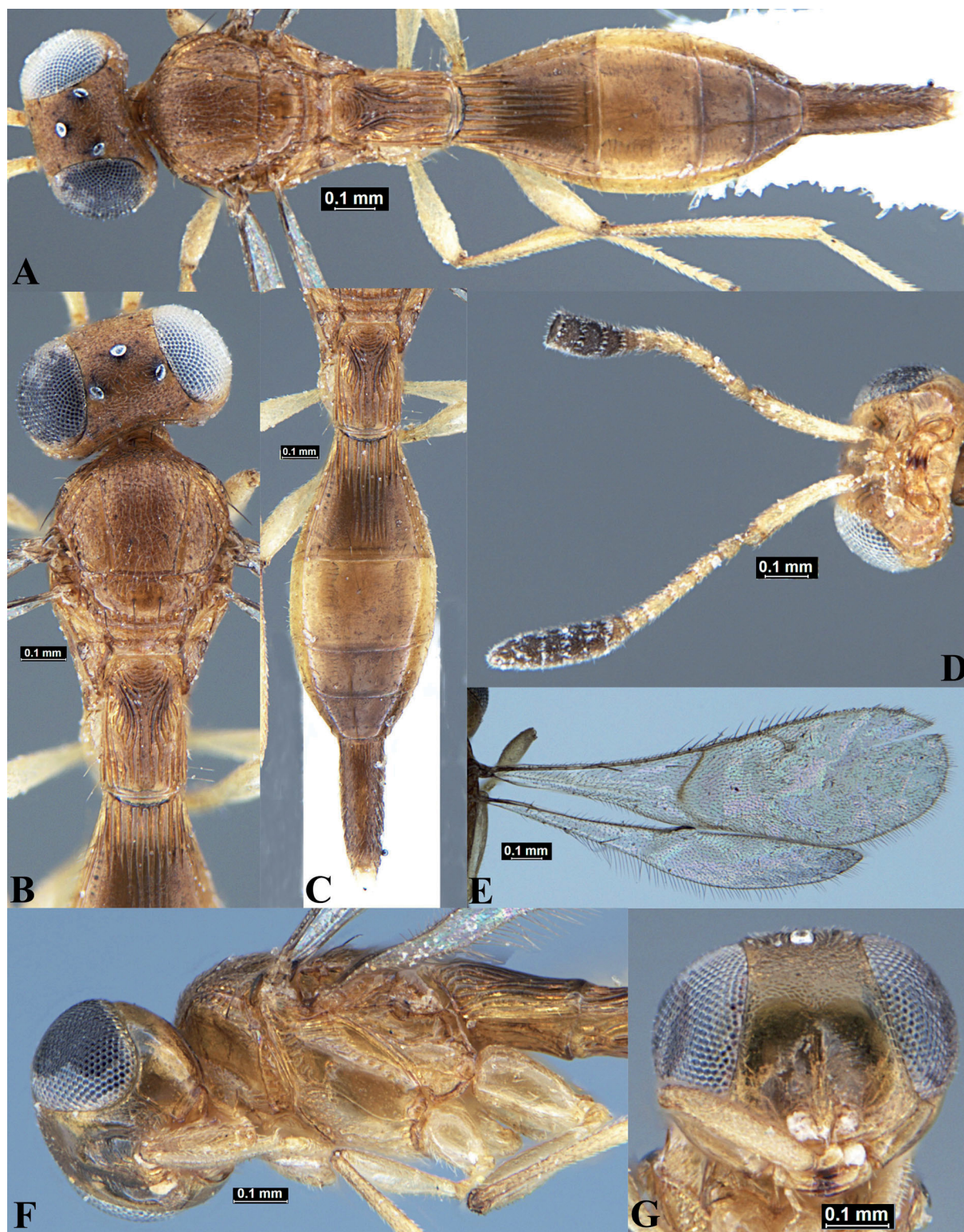


Fig. 14. *Calliscelio heramba* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5442). A. Habitus, dorsal view. B. Head and mesosoma. C. Metasoma. D. Antennae. E. Wings. F. Head and pleura. G. Frons. Scale bars = 0.1 mm.

Description

Female

MEASUREMENTS. Body length: 2.51–2.74 mm (n = 6).

COLOUR. Head: brown. Mesosoma: mesoscutum and mesoscutellum brown, metascutellum, dorsal propodeum and pleuron light brown. Horn on T1: brown-black. T1–T2: brown. T3: brown-yellow. T4–T6: brown. Antenna: radicle, A1–A6 light brown, other antennomeres black-brown. Legs: light brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: granulate. Sculpture of ventrolateral frons: smooth with transverse carinae on either side of central keel. Striae on lower frons: present. Frontal carina below median ocellus: absent. Setation of upper frons: small and dense. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: less than $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH distinctly greater than IOS. Central keel: long. Setae on compound eyes: short. Sculpture of vertex: granulate. Sculpture of postgena behind outer orbit: smooth. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: wider than long.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: reticulate-granulate. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: with dense short white setae interspersed with sparse thick black bristles. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: laterally rugose, medially smooth. Setation on mesoscutellum: sparse setae and thick black bristles. Scutoscuteellar sulcus between notauli: with incomplete foveae. Sculpture of metascutellum: unevenly rugose with a transverse medial depression. Shape of metascutellum: posterior margin straight, about $3 \times$ as wide as long, extending onto horn of T1. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: sparse. Sculpture of dorsal pronotal area: smooth to rugose. Sculpture of lateral pronotal area: smooth. Epomial carina: absent. Sculpture of netrion: transversely carinate, with rugose sculpture between carinae. Transverse carinae in dorsal mesopleuron: dense. Mesopleural carina: present, extending to sternaulus. Mesepimeral sulcus: weakly foveate. Sculpture of ventral mesopleuron: smooth except for weak foveae anteriorly. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: predominantly smooth except for weak foveae anteroventrally. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline. Basalis: present. Length of marginalis: as long as stigmalis and shorter than postmarginalis. Relative lengths of postmarginalis and stigmalis: postmarginalis distinctly about $2 \times$ as long as stigmalis. Setae on submarginalis: long, erect, exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: weakly developed. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1: dorsally with semicircular carinae, laterally with several arched carinae. Sculpture of T1 excluding horn: longitudinally carinate. Sculpture of T2: entirely longitudinally carinate, carinae extending almost entire length of tergite, except sublaterally. Sculpture of T3: smooth. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: smooth. Sculpture of T6: anteriorly longitudinally striate, remainder rugose. Shape of A6: about $3.2 \times$ as long as wide. Sculpture of S3: smooth.

Male

Unknown.

Calliscelio indicus Narendran & Ramesh Babu, 1999
Figs 2H, 15–17

Calliscelio indicus Narendran & Ramesh Babu, 1999: 2, 6.

Calliscelio urgo Kozlov & Lê, 2000: 47, 51. **Syn. nov.**

Calliscelio indicus – Rajmohana 2006: 120–121; 2014: 13, pl. IV figs 27–30.

Diagnosis

Calliscelio indicus is similar to *C. carinatus* but differs from it by the absence of a transverse carina beneath the median ocellus, the central keel on frons is absent, and transverse carinae on ventral frons are interrupted medially by a smooth band. While in the latter species, a transverse carina is present beneath the median ocellus, the central keel on frons is present, and the transverse carinae on ventral frons are continuous.

Material examined

Holotype of *Calliscelio urgo*

VIETNAM – **Gia Lai** • ♀; Dac Lak (Eakmat), paddy fields; 17 Sep. 1978; X.H. Lê leg.; IEHR.

Paratype of *Calliscelio indicus*

INDIA – **Kerala** • 1 ♀; Karimpuzha; 23 Apr. 1989; Narendran and party leg.; ZSI RB 229, 13443/H3.

Other material examined

INDIA – **Andaman and Nicobar Islands** • 7 ♀♀; Great Nicobar I., Campbell Bay; 7°00'27" N, 93°56'03" E; elev. 13 m; 22 Mar. 2016; YPT; NIM/NBAIR P5300 to P5306 • 2 ♂♂; same data as for preceding; NIM/NBAIR P5309, P5362 • 1 ♂; South Andaman I., Mount Harriet; 11°43'12" N, 92°44'00" E; elev. 354 m; 1 Feb. 2013; SN; NIM/NBAIR P5310. – **Assam** • 1 ♀; Dhemaji, Simen Chapori; 27°43'19" N, 94°52'05" E; elev. 120 m; 6 May 2014; SN; NIM/NBAIR P5308. – **Karnataka** • 7 ♀♀; Mandya; 12°33'51" N, 76°44'01" E; elev. 749 m; 7 Dec. 2016; YPT; NIM/NBAIR P5287 to P5291, P5360, P5480 • 5 ♀♀; Bengaluru; Institute of Wood Science and Technology (IWST); 13°00'40" N, 77°34'12" E; elev. 942 m; 24 Jan. 2013; YPT; NIM/NBAIR P5292 to P5295, P5361 • 1 ♀; Kanakapura; 12°32'46" N, 77°25'11" E; elev. 640 m; 19 Feb. 2016; YPT; NIM/NBAIR P5296 • 1 ♀; Tumkur, Hirehalli; 13°27'18" N, 77°18'01" E; elev. 846 m; 14 Dec. 2010; SN; NIM/NBAIR P5481 • 2 ♀♀; Srirangapattina; 12°25'17" N, 76°41'36" E; elev. 684 m; 26 Oct. 2015; YPT; NIM/NBAIR P5482, P5477. – **Kerala** • 1 ♀; Trivandrum; 8°25'44" N, 76°59'11" E; elev. 36 m; 22 Nov. 2015; YPT in banana (*Musa* sp.: Musaceae) plot; NIM/NBAIR P5307. – **Tamil Nadu** • 1 ♀; Periakulum, Kamatchipuram; 10°07'41" N, 77°35'59" E; elev. 297 m; 17 Aug. 2013; YPT; NIM/NBAIR P5478 • 3 ♀♀; Chidambaram, Agriculture College; 11°23'30" N, 79°42'48" E; elev. 21 m; 1 Jul. 2016; YPT; NIM/NBAIR P5297 to P5399.

Description

Female

MEASUREMENTS. Body length: 2.33–2.84 mm (n = 10).

COLOUR. Head: black. Mesosoma: black, except red-brown anterior margin of lateral pronotal area. Horn on T1: black. T1: entirely black except for a tinge of red posteriorly. T2–T5: black-brown. Antenna: radicle, A1–A2 brown with uneven black patches, other antennomeres black-brown. Legs: brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: coriaceous reticulate. Sculpture of ventrolateral frons: medially with a longitudinal smooth patch with transverse carinae on either side, and coriaceous reticulate towards orbits. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: short and dense. Hyperoccipital carina: absent.

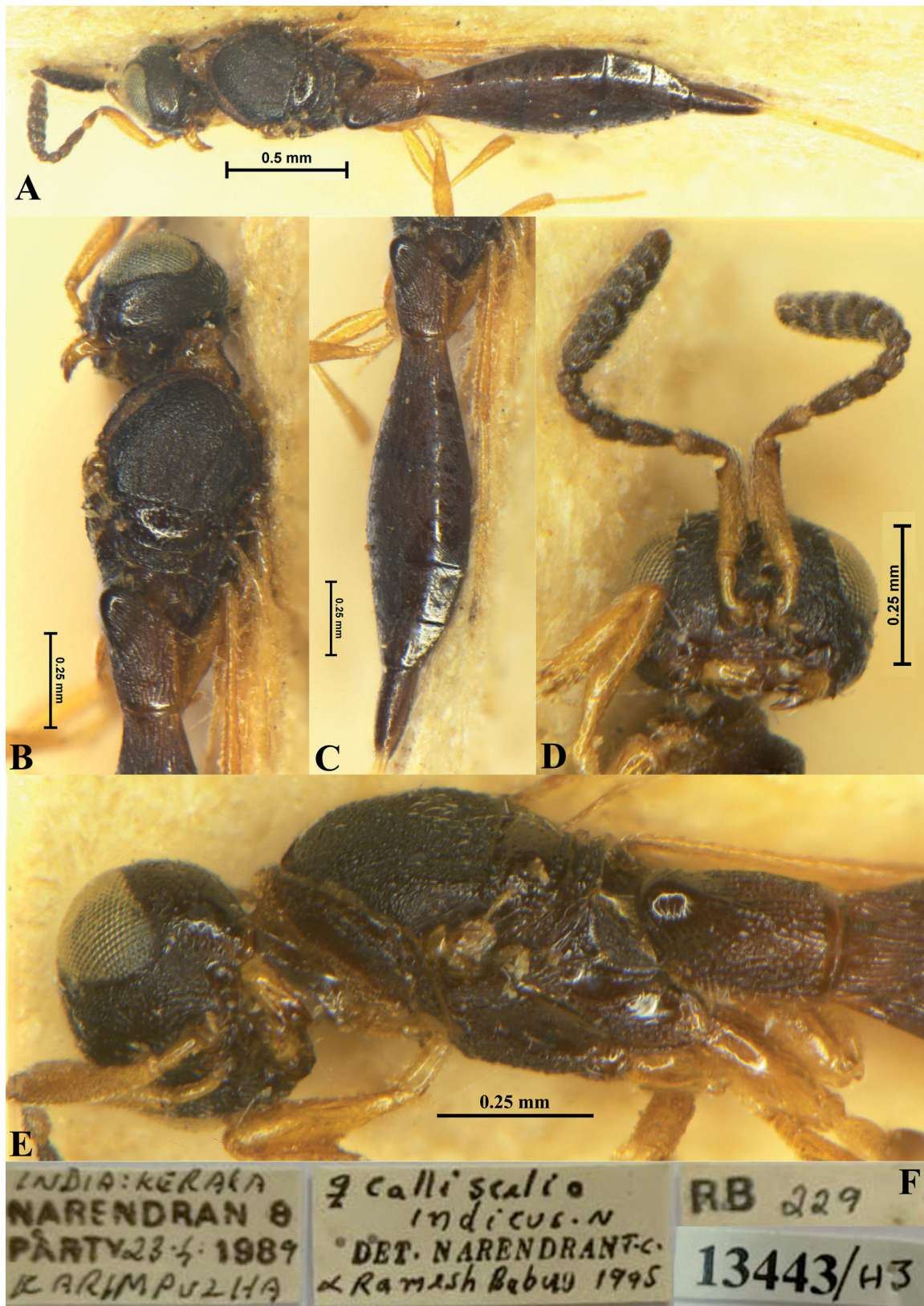


Fig. 15. *Calliscelio indicus* Narendran & Ramesh Babu, 1999, paratype, ♀ (ZSI RB 229, 13443/H3). A. Habitus, dorsolateral view. B. Head and mesosoma. C. Metasoma. D. Antennae. E. Head and pleura, lateral view. F. Type labels. Photos: ©ZSI, Kolkata, A. Rameshkumar.

Occipital carina: complete medially. Length of OOL: less than $0.5 \times$ ocellar diameter. Inner orbits: weakly diverging ventrally. IOS/EH: EH slightly more than IOS. Central keel: absent. Setae on compound eyes: sparse. Sculpture of vertex: coriaceous reticulate. Sculpture of postgena behind outer orbit: coriaceous reticulate. Sculpture of gena: predominantly smooth except for coriaceous reticulations towards orbit. Number of teeth on mandible: two, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: wider than long.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: coriaceous reticulate. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: dense. Length and width of mesoscutellum: around $2.4 \times$ as wide as long. Sculpture of mesoscutellum: entirely smooth with sparse punctae; medially smooth with sparse punctae, laterally rugose. Setation on mesoscutellum: dense. Scutoscullar sulcus between notauli: with incomplete foveae. Sculpture of metascutellum: anteriorly with a transverse row of pits and posteriorly with round foveae. Shape of metascutellum: rectangular, posterior margin straight, almost $4 \times$ as wide as long, not extending onto horn of T1. Dorsal propodeum:



Fig. 16. *Calliscelio urgo* Kozlov & Lê, 2000, holotype, ♀ (IEBR). **A.** Habitus, dorsal view. **B.** Habitus, lateral view. **C.** Head and pleura. **D.** Type labels. Photos: ©USNM, N.F. Johnson & E.J. Talamas.

excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: foveate. Setation of dorsal propodeum: dense. Sculpture of dorsal pronotal area: unevenly rugose. Sculpture of lateral pronotal area: obliquely striate interspersed with oblique carinae anteriorly. Epomial carina: absent. Sculpture of netrion: anteriorly

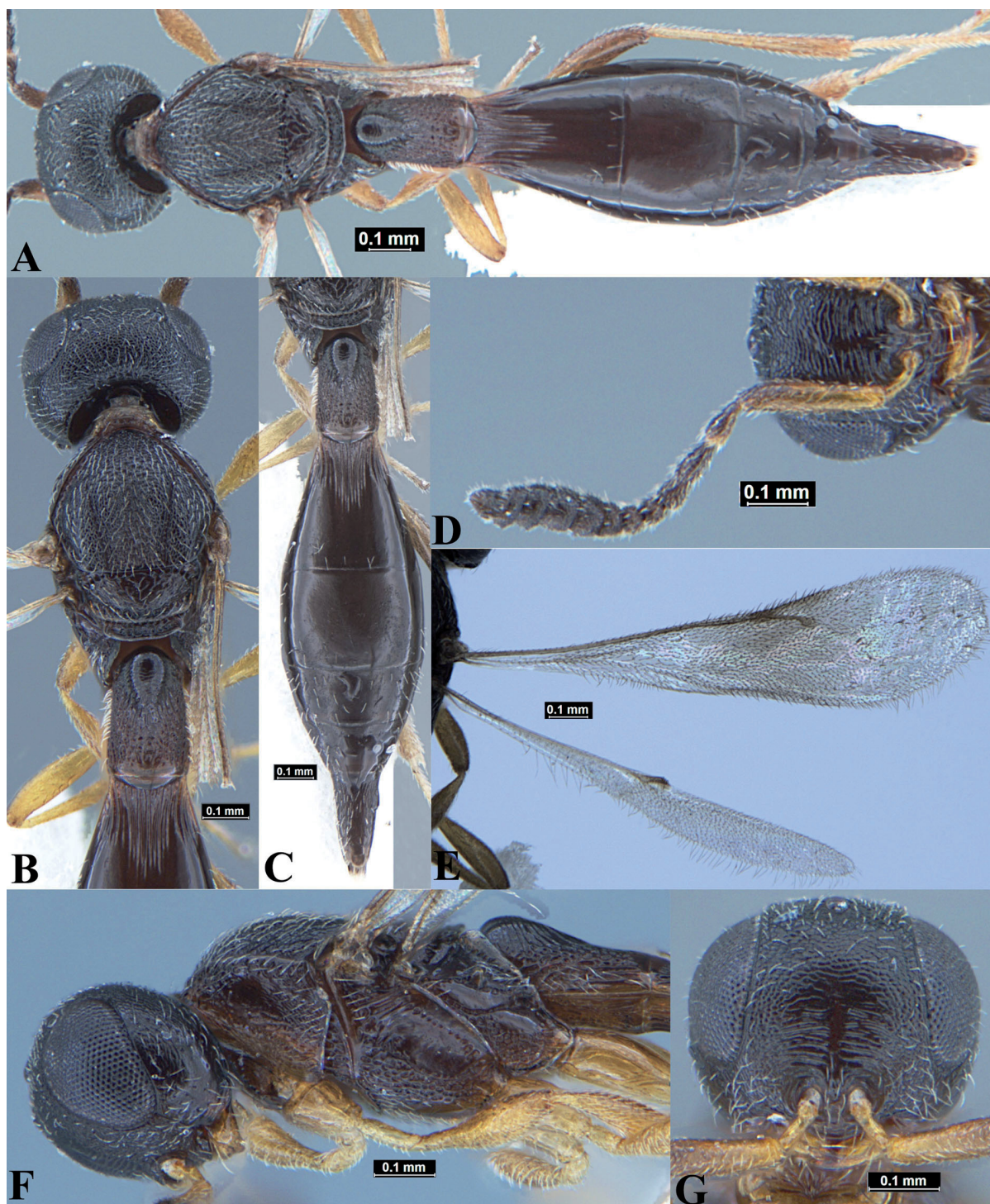


Fig. 17. *Calliscelio indicus* Narendran & Ramesh Babu, 1999, ♀ (NIM/NBAIR P5287). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antenna. **E.** Wings. **F.** Head and pleura. **G.** Frons. Scale bars = 0.1 mm.

foveate, remainder unevenly carinate. Transverse carinae in dorsal mesopleuron: dense. Mesepimeral sulcus: distinctly foveate. Mesopleural carina: present, extending up to sternaulus. Sculpture of ventral mesopleuron: densely foveate. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: densely foveate except for smooth area posterodorsally. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: attenuate. Colour of fore wing: hyaline, with a weak black band present medially. Basalis: absent. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis slightly longer than stigmalis. Setae on submarginalis: short, not exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: large and distinct. Relative widths of T1 horn and T1:T1 wider than horn. Sculpture of horn on T1: dorsally reticulate-striate and laterally carinate. Sculpture of T1 excluding horn: medially with short longitudinal carinae arising from base of horn not extending beyond $\frac{2}{3}$ of tergite, remainder with uneven depressions, posteromedially smooth. Sculpture of T2: smooth with anteromedial longitudinal carinae extending around half the length of tergite. Sculpture of T3: entirely smooth; medially smooth, with weak reticulations posterolaterally. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: smooth; smooth to weakly punctate. Sculpture of T6: anteriorly longitudinally striate, remainder smooth. Shape of T6: almost $2 \times$ as long as wide. Sculpture of S3: smooth.

Male (Figs 10B, 11B)

Body length = 1.91–2.05 mm ($n = 2$). Colour: head and mesosoma black. T1–T3 red-brown, remaining tergites black. Radicle, A1–A2 brown, remaining antennomeres black. Similar to female but for the filiform antennae and absence of horn on T1. Shape of antennomeres A2–A11: A3–A5 elongate around $1.8 \times$ as long as wide, A6–A11 ovoid about $1.4 \times$ as long as wide. Sculpture of T1: anteriorly smooth, remainder longitudinally carinate. Sculpture of T2: longitudinally carinate except for smooth area posteriorly. Sculpture of T3: smooth. Sculpture of T4–T7: smooth with setigerous punctae. Length of T2: approximately $1.5 \times$ as long as T1 and $1.2 \times$ T3.

Remarks

Type of *Calliscelio indicus* present in ZSI, Kolkata and *C. urgo* in IEBR.

***Calliscelio kaliya* Veenakumari sp. nov.**

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Figs 2I, 18

Diagnosis

Calliscelio kaliya sp. nov. is very similar to *C. orientalis*. It differs from the latter in having a tridentate mandible while the latter has a bidentate mandible. *Calliscelio kaliya* is also similar to *C. dido*, but differs from it in having EH distinctly greater than IOS, interantennal process is rugose and as long as wide. In *C. dido* EH and IOS are subequal while the interantennal process is longer than wide, smooth, and with a medial longitudinal groove.

Etymology

This species is named after the dreaded mythological serpent ‘Kaliya’, believed to have lived in the river Yamuna in northern India, which was subdued and banished to the underworld by the Hindu god Krishna. The name is treated as a noun in apposition.

Material examined

Holotype

INDIA – **Karnataka** • ♀; Mudigere, College of Horticulture; 13°06'54" N, 75°37'57" E; elev. 976 m; 30 Sep. 2015; YPT; NIM/NBAIR P5363.

Paratypes

INDIA – **Andaman and Nicobar Islands** • 1 ♀; Little Andaman, Harminder Bay; 10°34'08" N, 92°33'16" E; elev. 46 m; 29 Jan. 2013; SN; NIM/NBAIR P5366. – **Arunachal Pradesh** • 1 ♀; Pasighat, CHF; 28°04'28" N, 95°19'28" E; elev. 173 m; 3 May 2014; SN; NIM/NBAIR P5365. – **Himachal Pradesh** • 4 ♀♀; Dalhousie; 32°32'19" N, 75°58'15" E, elev. 2021 m; 17 Apr. 2009; SN; NIM/NBAIR P5367 to P5370. – **Karnataka** • 1 ♀; Bengaluru, Anekal, Pearl Valley; 12°41'10" N, 77°39'46" E; elev. 894 m; 13 May 2015; SN; NIM/NBAIR P5364.

Description

Female

MEASUREMENTS. Body length: 2.16–2.48 mm (n = 8).

COLOUR. Head: black. Mesosoma: mesoscutum light brown to dark brown, mesoscutellum dark brown; metascutellum, dorsal propodeum, and pleuron brown. Horn on T1: black-brown. T1: orange-brown. T2: anteriorly brown, posteriorly brown-black. T3: dark brown-black. T4–T6: black-brown. Antenna: radicle, A1–A4 yellow-brown, A5–A6 brown, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: smooth. Sculpture of ventrolateral frons: smooth. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: long and sparse. Hyperoccipital carina: absent. Occipital carina: interrupted medially. Length of OOL: less than $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH distinctly greater than IOS. Central keel: absent. Setae on compound eyes: short. Sculpture of vertex: anteriorly coriaceous reticulate, posteriorly smooth with setigerous punctae; entirely smooth with setigerous punctae. Sculpture of postgena behind outer orbit: foveate to setigerous punctate. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: as long as wide.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: largely smooth except for rugose sculpture on lateral internotaular area medially. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: dense. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: smooth. Setation on mesoscutellum: sparse. Scutoscuteellar sulcus between notauli: with complete foveae. Sculpture of metascutellum: anteriorly with a row of uneven pits, followed by a transverse carina, remainder smooth. Shape of metascutellum: posterior margin rounded, about $2.5 \times$ as wide as long, not extending onto horn of T1. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: dense. Sculpture of dorsal pronotal area: smooth with a transverse row of foveae posteriorly. Sculpture of lateral pronotal area: weakly rugose. Epomial carina: present. Sculpture of netrion: anteroventrally weakly foveate, remainder rugose. Transverse carinae in dorsal mesopleuron: sparse. Mesopleural carina: extending up to sternaulus. Mesepimeral sulcus: weakly foveate medially. Sculpture of ventral mesopleuron: smooth except for foveae anteriorly and dorsally. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: foveate, with a smooth area posterodorsally. Sculpture of hind coxa: smooth with weak striae. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline, with a weak black band present medially. Basalis: nebulous. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis distinctly longer than stigmalis. Setae on submarginalis: long, erect, exceeding anterior margin of wing.

METASOMA. Horn on T1 in female: large and distinct. Relative widths of T1 horn and T1: T1 wider than horn. Sculpture of horn on T1 dorsally: smooth. Sculpture of T1 excluding horn: longitudinally carinate, posteriorly smooth. Sculpture of T2: smooth with anteromedial longitudinal carinae extending half the

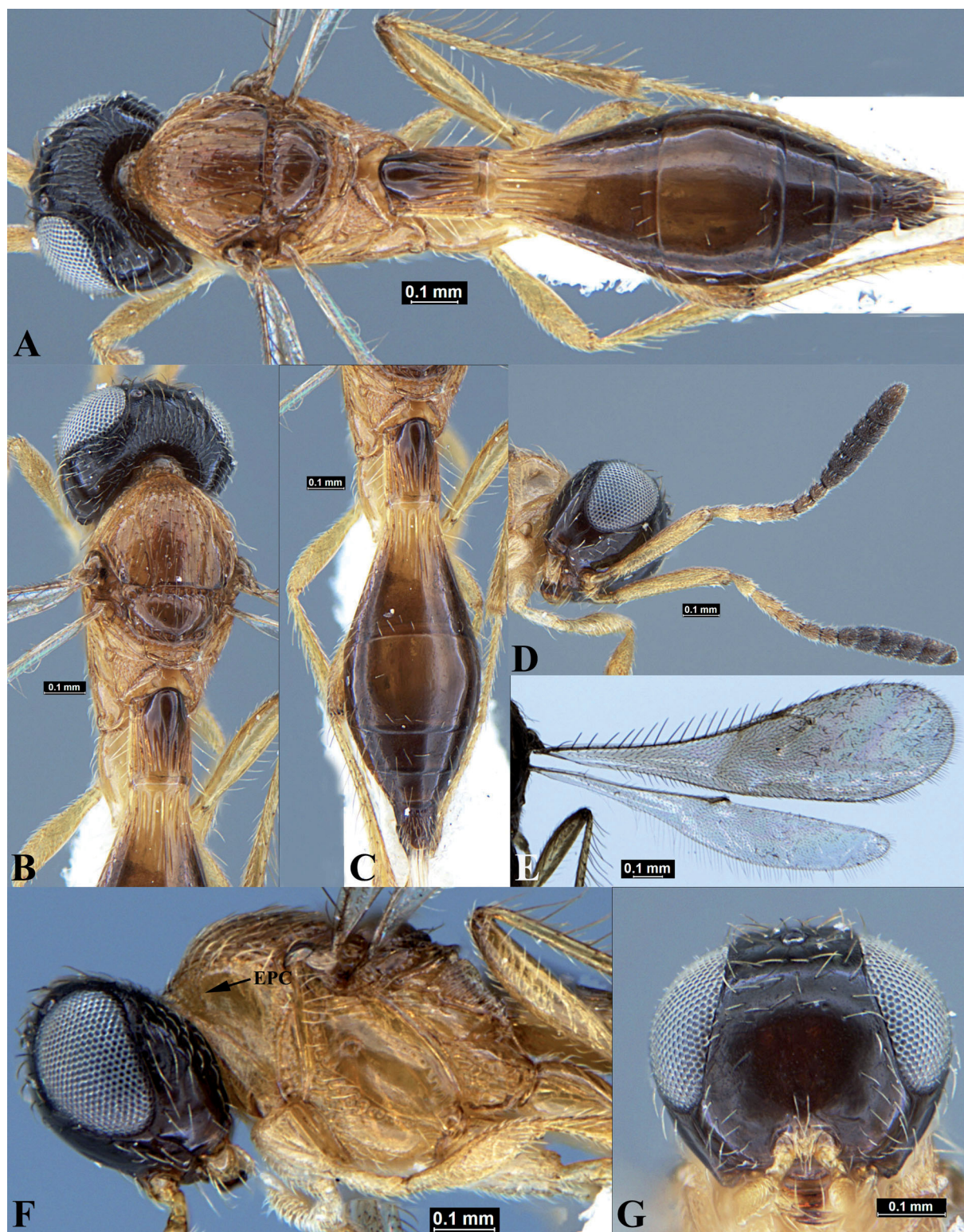


Fig. 18. *Calliscelio kaliya* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5363). A. Habitus, dorsal view. B. Head and mesosoma. C. Metasoma. D. Antennae. E. Wings. F. Head and pleura. G. Frons. Scale bars = 0.1 mm.

length of tergite. Sculpture of T3: smooth. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: smooth. Sculpture of T6: anteriorly with a small semicircular smooth area, followed by a transverse row of foveae, remainder smooth. Shape of A6: as long as wide. Sculpture of S3: smooth.

Male

Unknown.

Calliscelio longicarinatus Narendran & Ramesh Babu, 1999

Figs 2J, 19–20

Calliscelio longicarinatus Narendran & Ramesh Babu, 1999: 2, 7.

Calliscelio longicarinatus – Rajmohana 2006: 120–121.

Diagnosis

Calliscelio longicarinatus is similar to *C. abbakkae* sp. nov. but differs from it in having EH greater than IOS, the setae on submarginalis extending beyond the anterior margin of the wing, and the horn on T1 with arched carinae posteriorly. In *C. abbakkae* IOS is greater than EH, the setae on submarginalis are short, not exceeding the anterior margin of the wing, and the horn on T1 is posteriorly rugose.

Material examined

Holotype

INDIA – **Kerala** • ♀; Calicut University campus; 23 Dec.1989; Narendran and party leg.; USNM USNMMENT00896494.

Other material examined

INDIA – **Karnataka** • 1 ♀; Bengaluru, Kengeri; 12°57'25" N, 77°31'39" E; elev. 857 m; 19 Apr. 2017; YPT; NIM/NBAIR P5407. – **Tamil Nadu** • 1 ♀; Dindugul, Thandikudi, RCRS; 10°18'34" N, 77°38'34" E; elev. 1305 m; 20 Jan. 2017; YPT in coffee (*Coffea arabica* L.: Rubiaceae) plot; NIM/NBAIR P5406.

Description

Female

MEASUREMENTS. Body length: 2.31–2.42 mm (n = 2).

COLOUR. Head: black. Mesosoma: mesoscutum red-brown, mesoscutellum and metascutellum brown-black, pleuron yellow-brown. Horn on T1: black-brown. T1: yellow-brown. T2: anteriorly yellow-brown, posteriorly brown-black. T3–T6: brown-black. Antenna: radicle, A1–A5 brown, A6 dark brown, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: smooth, except for coriaceous reticulations towards orbit. Sculpture of ventrolateral frons: smooth, medially with incomplete foveae on either side of scrobe, and coriaceous reticulations towards malar sulcus. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: long and sparse. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: less than $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH greater than IOS. Central keel: absent. Setae on compound eyes: absent. Sculpture of vertex: anteriorly coriaceous reticulate, posteriorly smooth with setigerous punctae. Sculpture of postgena behind outer orbit: foveate. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: as wide as long.

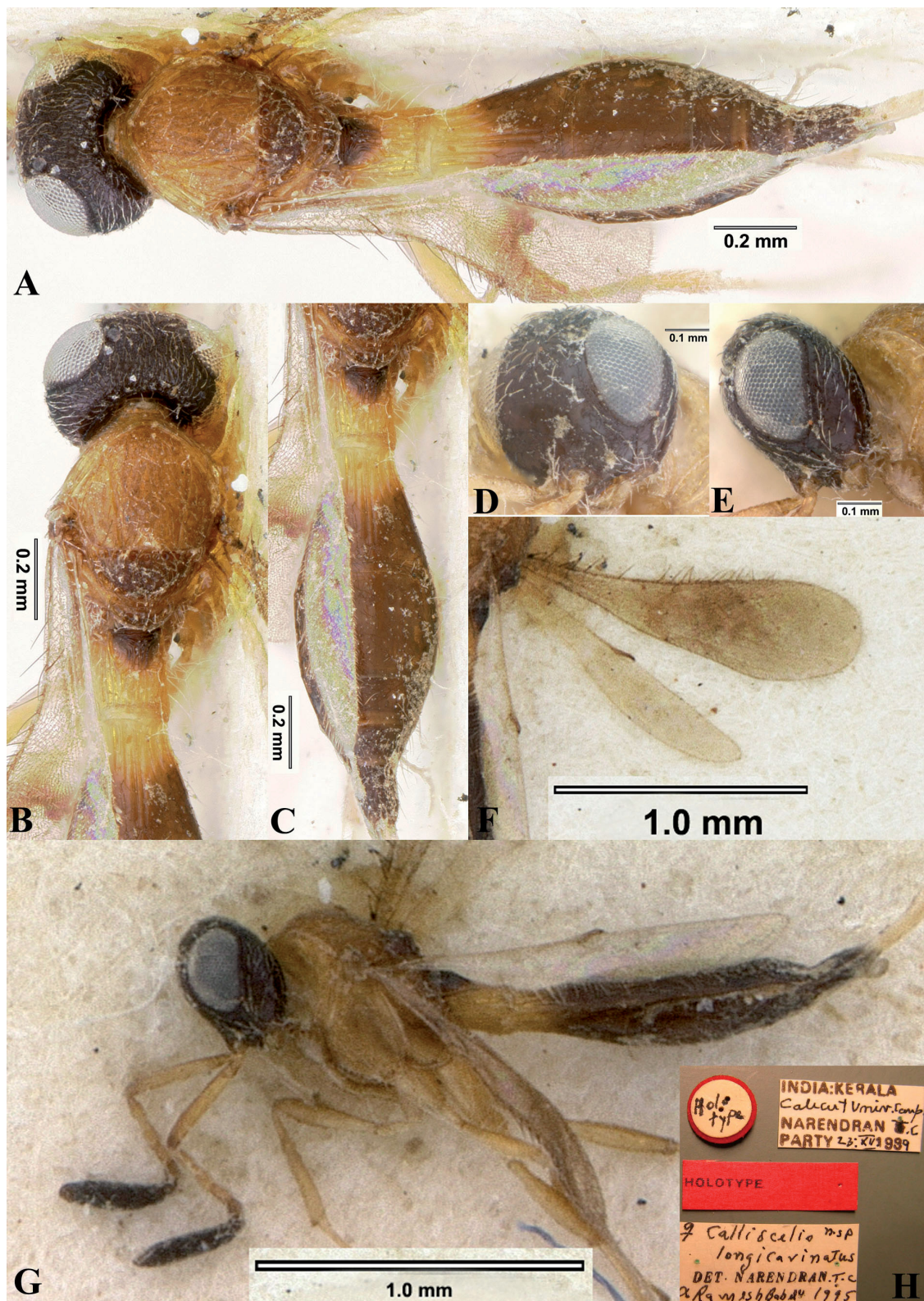


Fig. 19. *Calliscelio longicarinatus* Narendran & Ramesh Babu, 1999, holotype, ♀ (USNM USNMENT00896494). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Head, frontal view. **E.** Head, lateral view. **F.** Wings. **G.** Habitus, lateral view. **H.** Type labels. Photos: ©USNM, N.F. Johnson.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: anterior internotaular area reticulate and remainder smooth. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: sparse. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum:

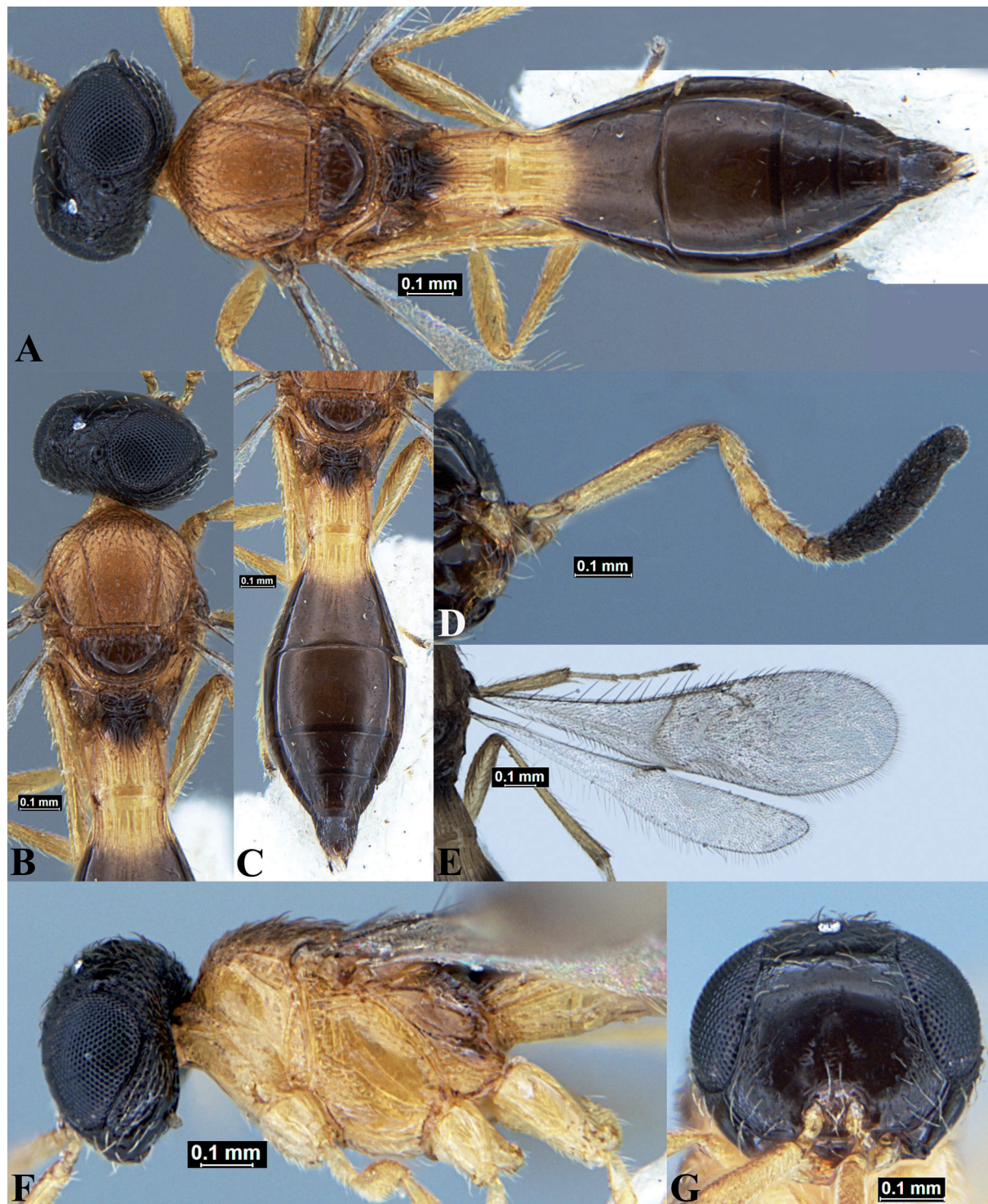


Fig. 20. *Calliscelio longicarinatus* Narendran & Ramesh Babu, 1999, ♀ (NIM/NBAIR P5406). A. Habitus, dorsal view. B. Head and mesosoma. C. Metasoma. D. Antenna. E. Wings. F. Head and pleura. G. Frons. Scale bars = 0.1 mm.

smooth. Setation on mesoscutellum: sparse. Scutoscutellar sulcus between notauli: with complete foveae. Sculpture of metascutellum: anteriorly rugose, remainder heart shaped with a median longitudinal carina, from which several transverse carinae radiate on either side. Shape of metascutellum: posterior margin rounded, extending onto horn of T1, about $2 \times$ as wide as long. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: sparse. Sculpture of dorsal pronotal area: weakly rugose. Sculpture of lateral pronotal area: smooth to weakly rugose. Epomial carina: absent. Sculpture of netrion: rugose. Transverse carinae in dorsal mesopleuron: sparse. Mesopleural carina: present, extending to sternaulus. Mesepimeral sulcus: weakly foveate. Sculpture of ventral mesopleuron: dorsally and anteriorly foveate, remainder smooth. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: foveate with a smooth area posterodorsally. Sculpture of hind coxa: smooth with striae. Base of fore wing and hind wing: wide. Colour of fore wing: no bands, entire wing weakly infusate. Basalis: present. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis longer than stigmalis. Setae on submarginalis: long, erect, exceeding anterior margin of wing.

METASOMA. Horn on T1 in female: weakly developed. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1: anteriorly transversely carinate, posteriorly with arched carinae. Sculpture of T1 excluding horn: longitudinally carinate, posteriorly smooth. Sculpture of T2: anteriorly with a smooth band followed by longitudinal carinae anteromedially, remainder smooth. Sculpture of T3: smooth; smooth with weak striae laterally. Relative lengths of T2/T3: T2 slightly longer than T3. Sculpture of T4: smooth; smooth with weak striae laterally. Sculpture of T6: with a medial longitudinal smooth area, laterally with setigerous punctae. Shape of A6: as long as wide. Sculpture of S3: smooth.

Male

Unknown.

Remarks

Type material in USNM.

Calliscelio obavvae Veenakumari sp. nov.

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Figs 21, 22A

Diagnosis

Calliscelio obavvae sp. nov. is similar to *C. agaliensis*. It differs from the latter in having the ventral metapleural area smooth with oblique striae, ventral mesopleuron smooth, and T6 longer than wide. In the latter species, the ventral metapleural area is foveate with a small smooth area posterodorsally, the ventral mesopleuron is densely foveate, and T6 is as long as wide.

Etymology

This species epithet takes after Onake Obavva, the legendary wife of a guard at the Chitradurga fort (Karnataka, India), who singlehandedly incapacitated the soldiers of Hyder Ali's army by striking them on the head with an 'onake' or pestle as they attempted gaining entry into the fort in single file through a narrow secret tunnel. The name is treated as a noun in the genitive case.

Material examined

Holotype

INDIA – **Rajasthan** • ♀; Udaipur, Aaram Bagh; 24°25'01" N, 73°38'18" E; elev. 505 m; 23 Sep. 2016; YPT near water; NIM/NBAIR P5395.

Paratypes

INDIA – **Himachal Pradesh** • 1 ♀; Chamba; 32°33'12" N, 76°07'32" E; elev. 1006 m; 24 Jul. 2005; SN; NIM/NBAIR P5414. – **Rajasthan** • 7 ♀♀; Ajmer, Tabiji, ICAR-National Research Centre on Seed Spices (NRCSS); 26°21'56" N, 74°35'36" E; elev. 445 m; YPT; 22 Sep. 2016; NIM/NBAIR P5396 to P5398, P5400, P5408 to P5410 • 12 ♀♀; Ajmer, Tabiji, Agricultural Research sub-station (ARSS); 26°27'00" N, 74°38'24" E, elev. 403 m; 21 Sep. 2016; YPT; NIM/NBAIR P5399, P5463 to P5473 • 3 ♀♀; Udaipur, Badgaon; 24°38'11" N, 73°40'48" E; elev. 178 m; 24 Sep. 2016; YPT; NIM/NBAIR P5411 to P5413.

Description

Female

MEASUREMENTS. Body length: 2.43–2.87 mm (n = 10).

COLOUR. Head: yellow-brown. Mesosoma: yellow-brown. Horn on T1: black-brown. T1–T3: yellow-brown. T4: anterolaterally yellow-brown, remainder black-brown. T5–T6: black-brown. Antenna: radicle, A1–A6 yellow-brown, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: largely smooth, except for rugose sculpture dorsally. Sculpture of ventrolateral frons: smooth, with oblique striae on either side of scrobe. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: short and sparse. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: less than $0.5 \times$ of ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: IOS greater than EH. Central keel: absent. Setae on compound eyes: absent. Sculpture of vertex: anteriorly reticulate, posteriorly smooth with setigerous punctae. Sculpture of postgena behind outer orbit: weakly rugose; smooth. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: longer than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: wider than long.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: reticulate. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: sparse. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: weakly reticulate. Setation on mesoscutellum: dense. Scutoscuteellar sulcus between notauli: not foveate. Sculpture of metascutellum: anteriorly foveate, remainder transparent with wavy transverse striae interspersed with sparse longitudinal carinae. Shape of metascutellum: posterior margin rounded, extending onto horn of T1, about $2.5 \times$ as wide as long. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: sparse. Sculpture of dorsal pronotal area: weakly rugose. Sculpture of lateral pronotal area: weakly rugose, interspersed with oblique striae posterad; smooth. Epomial carina: absent. Sculpture of netrion: anteriorly with a weak row of foveae, remainder predominantly smooth. Transverse carinae in dorsal mesopleuron: sparse. Mesopleural carina: weak, extending to sternaulus. Mesepimeral sulcus: weakly foveate. Sculpture of ventral mesopleuron: dorsally and anteriorly foveate, remainder smooth. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: entirely smooth, except for oblique striae medially. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: no bands, entire wing weakly infuscate. Basalis: absent. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and

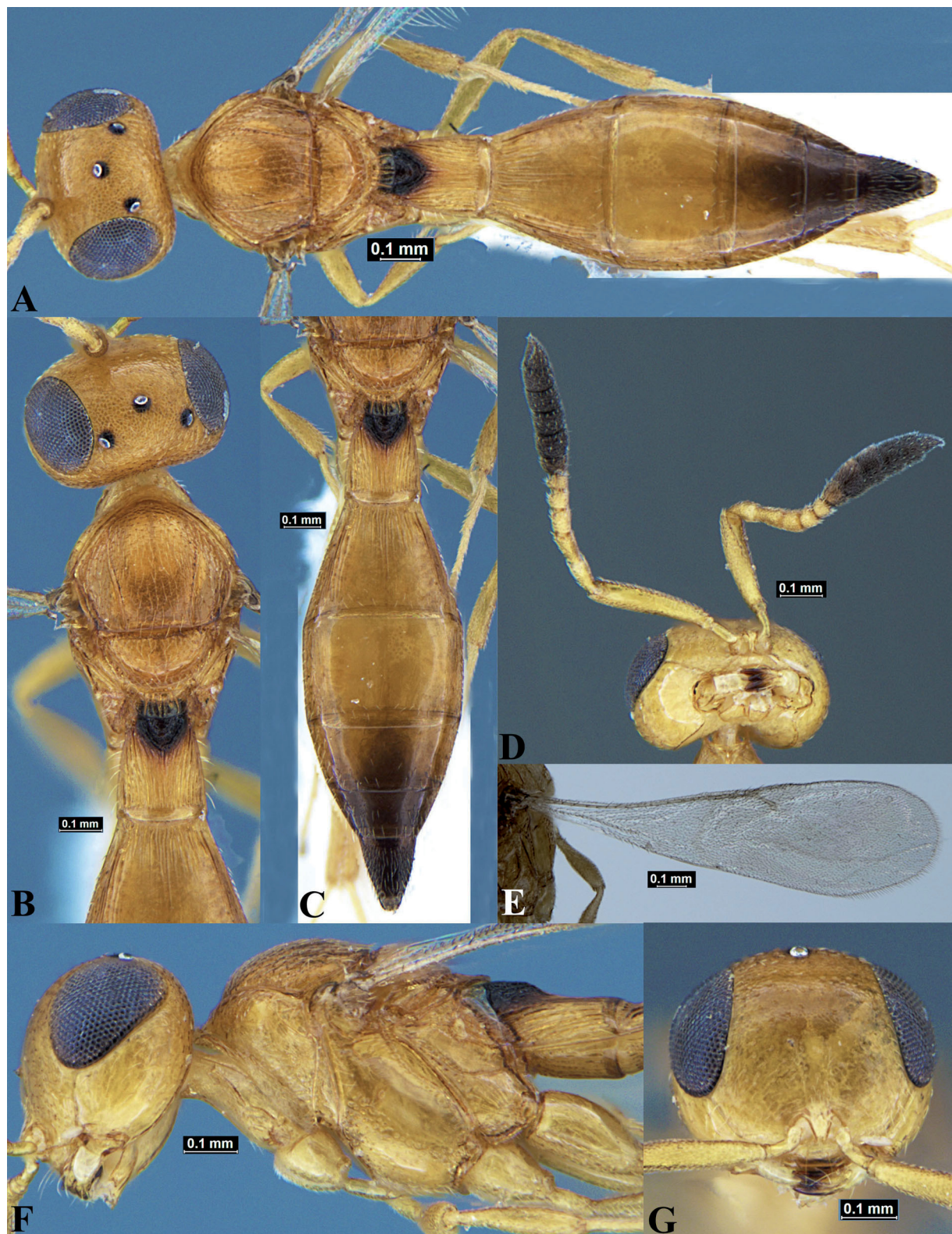


Fig. 21. *Calliscelio obavvae* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5395). A. Habitus, dorsal view. B. Head and mesosoma. C. Metasoma. D. Antennae. E. Wings. F. Head and pleura. G. Frons. Scale bars = 0.1 mm.

stigmalis: postmarginalis subequal in length to stigmalis. Setae on submarginalis: short not exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: large and distinct. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1 dorsally: rugose and with a V-shaped carina posteriorly; reticulate with V-shaped carina posteriorly. Sculpture of T1 excluding horn: longitudinally carinate, posteriorly smooth. Sculpture of T2: smooth with anteromedial longitudinal carinae extending half length and lateral tergites extending entire length of tergite. Sculpture of T3: entirely smooth except longitudinal carinae laterally; with weak impressions reticulations medially. Relative lengths of T2/T3: T2 and T3 subequal. Sculpture

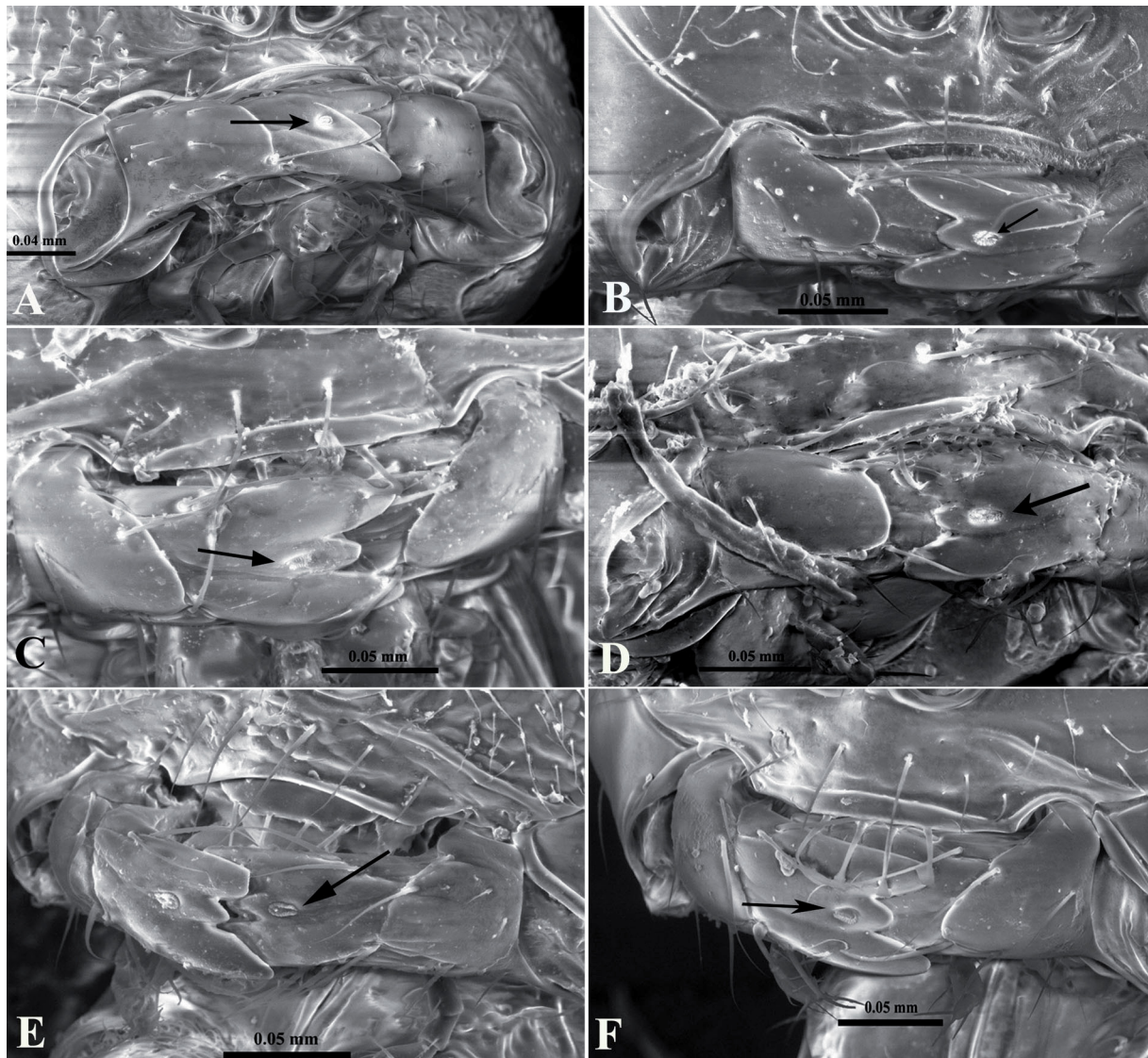


Fig. 22. Mandibles showing prioniform sensillum (black arrows), ♀♀. **A.** *Calliscelio obavvae* Veenakumari sp. nov., paratype (NIM/NBAIR P5396). **B.** *C. pinaki* Veenakumari sp. nov., holotype (NIM/NBAIR P5457). **C.** *C. rugosus* Rajmohana & Peter, 2012 (NIM/NBAIR P5329). **D.** *C. shesha* Veenakumari sp. nov., paratype (NIM/NBAIR P5418). **E.** *C. sundari* Veenakumari sp. nov., paratype (NIM/NBAIR P5402). **F.** *C. ulupi* Veenakumari sp. nov., paratype (NIM/NBAIR P5419). Scale bars = 0.05 mm.

of T4: smooth. Sculpture of T6: anteromedially smooth, remainder smooth with dense setigerous punctae. Shape of A6: slightly longer than wide. Sculpture of S3: smooth.

Male

Unknown.

Calliscelio orientalis Sharma, 1978

Figs 23–24

Calliscelio orientalis Sharma in Saraswat & Sharma, 1978: 34.

Calliscelio tiro Kozlov & Lê, 2000: 47, 50. **Syn. nov.**

Calliscelio orientalis – Sharma 1982: 323. — Mani & Sharma 1982: 179. — Narendran & Ramesh Babu 1999: 2. — Rajmohana 2006: 120.

Diagnosis

Calliscelio orientalis is close to *C. dido* and *C. kaliya* sp. nov. but differs from them in having bidentate mandibles while the latter two species have tridentate mandibles.

Material examined

Holotype of *Calliscelio orientalis*

INDIA – Uttarakhand • ♀; Kumaon, Kausani; 29–30 Jul. 1974; M.S. Mani and party leg.; USNM USNMMENT 01109840.

Holotype of *Calliscelio tiro*

VIETNAM – Gia Lai • ♀; An Khe, Buon Luoi; 3 Dec. 1978; X.H. Lê leg.; IEBR.

Description

Female

MEASUREMENTS. Body length: 2.3–2.85 mm (n = 2) (Saraswat & Sharma 1978).

COLOUR. Head: black. Mesosoma: brown-red. Horn on T1: black-brown. T1: yellow-brown. T2: anteriorly yellow-brown, posteriorly brown-red. T3: red-brown. T4–T6: black-brown. Antenna: A1–A3 brown, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Setation of upper frons: long and sparse. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: less than $0.5 \times$ of ocellar diameter. Setae on compound eyes: short and sparse. Sculpture of vertex: interocellar area smooth, followed by transverse granulate patch, posteriorly weakly rugose. Sculpture of gena: smooth. Number of teeth on mandible: two, subequal in size. Length of A2: shorter than A3. Length of A4: half the length of A3. Length of A5: shorter than A3. Shape of A6: slightly longer than wide.

MESOSOMA. Length and width of mesoscutum: almost as long as wide. Sculpture of mesoscutum: smooth except for a small rugose patch along inner margin of notaulus medially. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: sparse. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: smooth. Setation on mesoscutellum: sparse. Scutoscuteellar sulcus between notauli: with complete foveae. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: dense. Sculpture of dorsal pronotal area: foveate. Sculpture of lateral pronotal area: smooth to weakly rugose. Epomial carina: absent. Sculpture of netrion: anteriorly with a weak depression and posteriorly foveate. Transverse carinae in dorsal mesopleuron:

sparse. Mesopleural carina: present, extending to mesopleural pit. Mesepimeral sulcus: weakly foveate. Sculpture of ventral mesopleuron: entirely smooth except for foveae dorsally and anteriorly. Sculpture of dorsal metapleural area: smooth to weakly rugose. Sculpture of ventral metapleural area: almost smooth. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline, with no bands. Basalis: absent. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis more than $1.7\times$ as long as stigmalis. Setae on submarginalis: long, erect, exceeding anterior margin of wing.

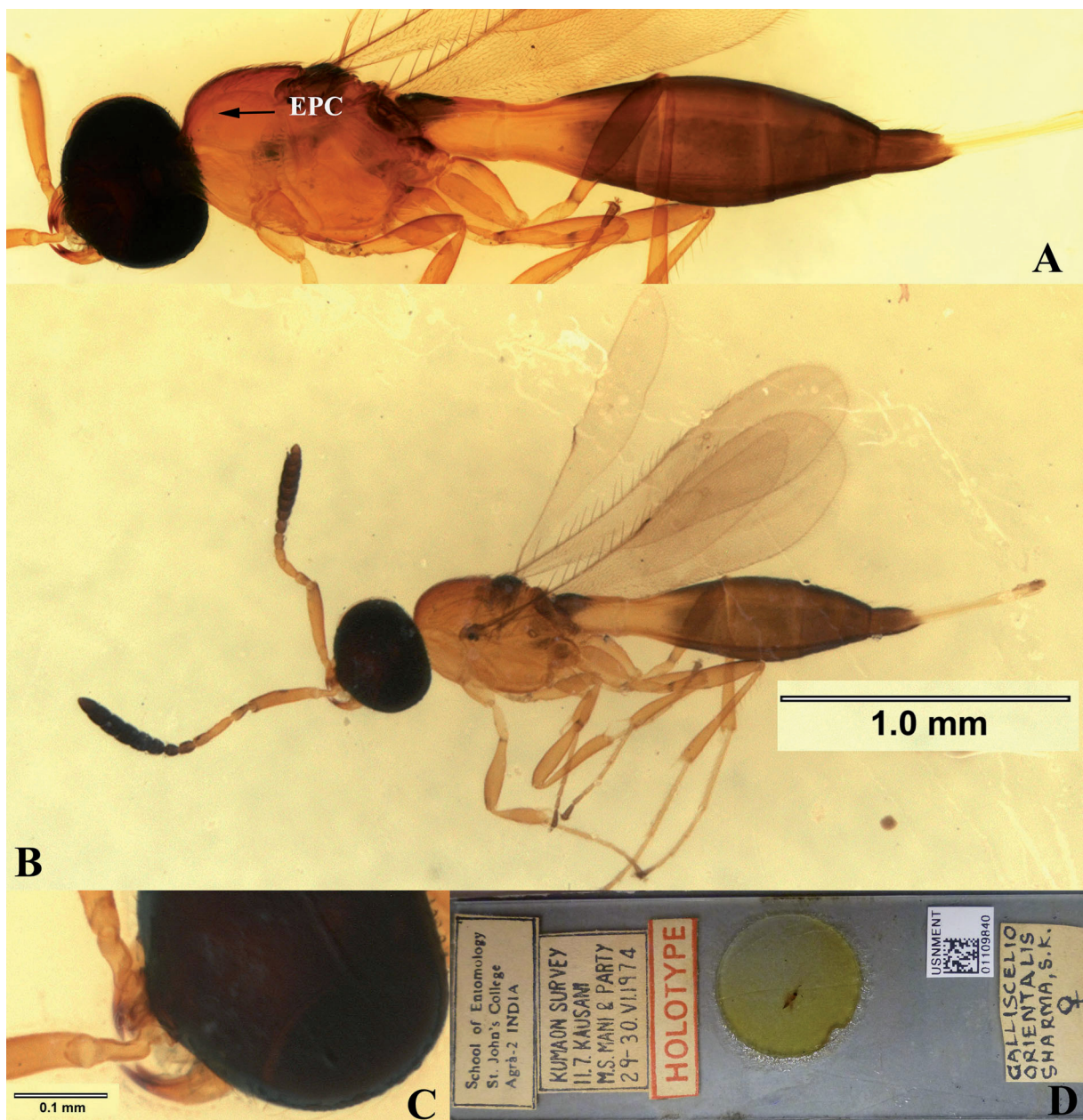


Fig. 23. *Calliscelio orientalis* Sharma, 1978, holotype, ♀ (USNM USNMENT01109840). **A–B.** Habitus, lateral views (arrow shows the epomial carina, EPC). **C.** Bidentate mandibles. **D.** Slide of holotype. Photos: ©USNM, N.F. Johnson.

METASOMA. Horn on T1 in female: weakly developed. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1 dorsally: anteriorly with transverse and posteriorly with longitudinal carinae. Sculpture of T1 excluding horn: longitudinally carinate. Sculpture of T2: smooth with anteromedial longitudinal carinae. Sculpture of T3: entirely smooth except for sparse punctae posteriorly. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: anteriorly and posteriorly punctate with transverse smooth area medially. Sculpture of T6: anteriorly transversely reticulate, remainder smooth with dense setigerous punctae. Shape of A6: longer than wide. Sculpture of S3: smooth.

Male

Body length = 2.4–2.5 mm. Similar to female but for the filiform antennae and absence of horn on T1. Shape of antennomeres A2–A12: elongate, A3, A4, A11 $2.6\times$ as long as wide, A5–A10 $3\times$ as long as wide. Sculpture of T1: entirely longitudinally carinate. Sculpture of T2: anteriorly longitudinally carinate, posteriorly smooth. Sculpture of T3–T7: smooth. Length of T2: approximately $1.5\times$ as long as T1 and $1.3\times$ as long as T3.

Remarks

The description is based on the holotype, images in Popovici *et al.* (2024) (see Figs 20–23) and description in Saraswat & Sharma (1978). Type of *C. orientalis* is in USNM and that of *C. tiro* in IEBR.



Fig. 24. *Calliscelio tiro* Kozlov & Lê, 2000, holotype, ♀ (IEBR). **A.** Habitus, dorsal view. **B.** Head and pleura. **C.** Type labels. Photos: ©USNM, N.F. Johnson & E.J. Talamas.

Calliscelio pinaki Veenakumari sp. nov.

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Figs 22B, 25

Diagnosis

Calliscelio pinaki sp. nov. is similar to *C. glabratus* but differs from it in having T1 and T6 at most $1.5\times$ as long as wide, and the occipital carina is not sculptured medially. In *C. glabratus* T1 and T6 are elongate, at least $2\times$ as long as wide, and occipital carina is medially sculptured.

Etymology

This species is named ‘pinaki’, after the divine bow of Siva, the Hindu god of destruction. The name is treated as a noun in apposition.

Material examined

Holotype

INDIA – Sikkim • ♀; Gangtok, Ranka; 27°20'37" N, 88°35'14" E; elev. 1307 m; 14 Oct. 2008; SN; NIM/NBAIR P5457.

Paratype

INDIA – Sikkim • 1 ♀; same data as for holotype; NIM/NBAIR P5458.

Description

Female

MEASUREMENTS. Body length: 2.49–2.63 mm ($n = 2$).

COLOUR. Head: black. Mesosoma: brown-red, pleuron brown. Horn on T1: brown-red. T1: red-brown. T2: anteriorly red-brown, posteriorly brown-red. T3–T6: brown-red. Antenna: radicle, A1–A2 brown with uneven patches of black, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: smooth. Sculpture of ventrolateral frons: smooth. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: long and sparse. Hyperoccipital carina: weakly indicated. Occipital carina: complete medially. Length of OOL: less than $0.5\times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH distinctly greater than IOS. Central keel: absent. Setae on compound eyes: short and sparse. Sculpture of vertex: granulate with sparse setigerous punctae. Sculpture of postgena behind outer orbit: tuberculate. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: as long as wide.

MESOSOMA. Length and width of mesoscutum: slightly wider than long. Sculpture of mesoscutum: entirely rugose except for a medial smooth patch. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: sparse. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: anteromedially smooth, remainder rugose. Setation on mesoscutellum: sparse. Scutoscutellar sulcus between notauli: with incomplete foveae. Sculpture of metascutellum: anteriorly rugose, posteriorly smooth. Shape of metascutellum: posterior margin rounded, extending onto horn of T1, about $2\times$ as wide as long. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: unevenly sculptured. Setation of dorsal propodeum: dense. Sculpture of dorsal pronotal area: rugose. Sculpture of lateral pronotal area: rugose-reticulate. Epomial carina: absent. Sculpture of netrion: smooth to rugose except for sparse foveae anteriorly. Transverse carinae in dorsal mesopleuron: sparse. Mesopleural carina:

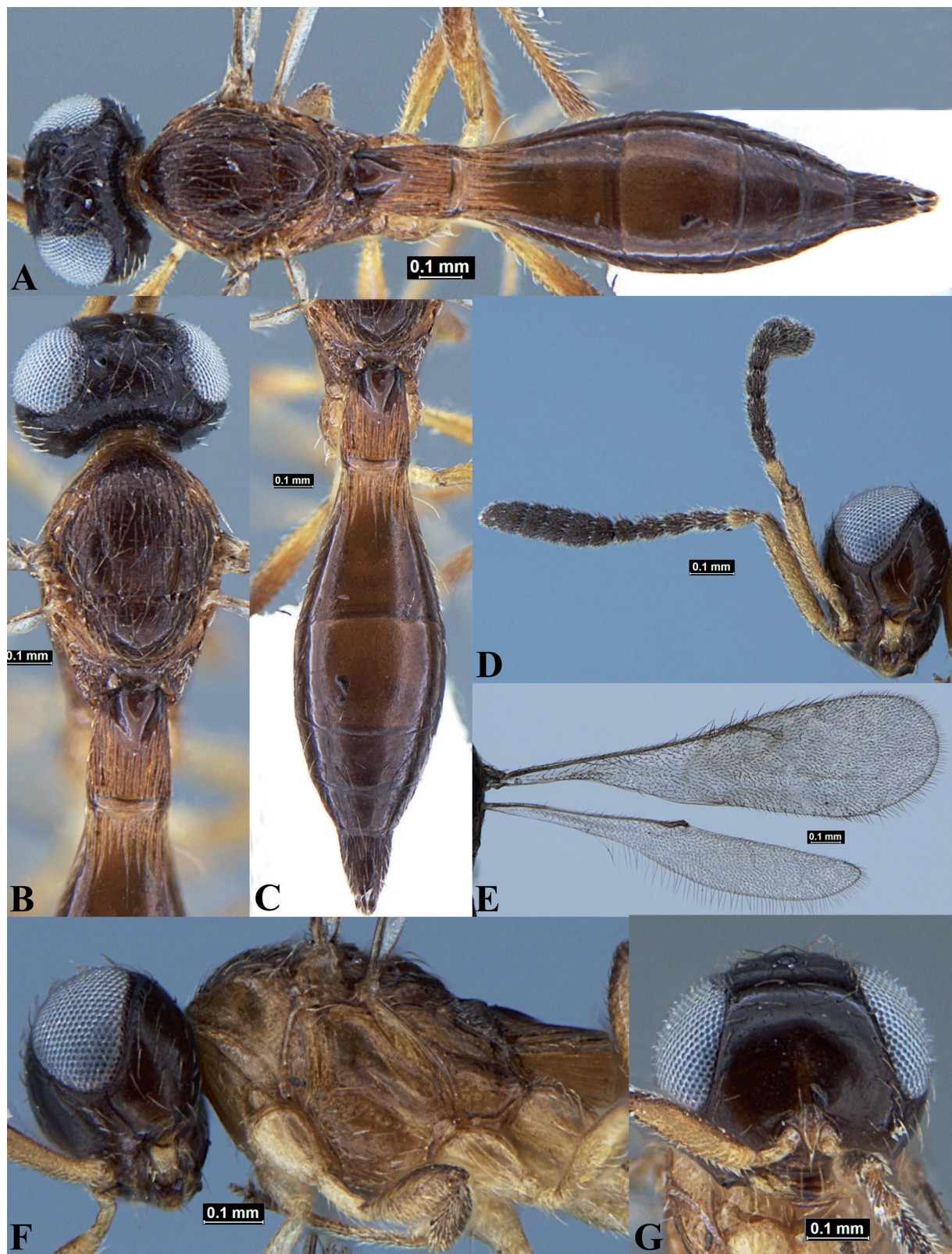


Fig. 25. *Calliscelio pinaki* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5457). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antennae. **E.** Wings. **F.** Head and pleura. **G.** Frons. Scale bars = 0.1 mm.

weakly indicated, extending to sternaulus. Mesepimeral sulcus: indicated as a carina. Sculpture of ventral mesopleuron: entirely smooth except for foveae dorsally and anteriorly. Sculpture of dorsal metapleural area: rugose. Sculpture of ventral metapleural area: foveate with a smooth area posterodorsally. Sculpture of hind coxa: smooth to weakly rugose. Base of fore wing and hind wing: wide. Colour of fore wing: no bands, weakly infuscate in distal half. Basalis: nebulous. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis more than $2 \times$ as long as stigmalis. Setae on submarginalis: long, erect, exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: present as a small bulge. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1 dorsally: smooth. Sculpture of T1 excluding horn: longitudinally carinate, posteriorly smooth. Sculpture of T2: smooth with anteromedial longitudinal carinae extending half the length of tergite. Sculpture of T3: weakly rugose-punctate. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: weakly punctate. Sculpture of T6: basal half longitudinally striate, remainder with setigerous punctae except for a smooth patch medially. Shape of A6: around $1.5 \times$ as long as wide. Sculpture of S3: smooth.

Male

Unknown.

Calliscelio rugosus Rajmohana & Peter, 2012
Figs 22C, 26

Diagnosis

Calliscelio rugosus is similar to *C. hubo*. It differs from the latter species by the presence of transverse carinae on metascutellum and T6 being not more than $1.5 \times$ as long as wide. In *C. hubo* metascutellum is smooth with longitudinal carinae and T6 is around $2.5 \times$ as long as wide.

Material examined

INDIA – **Karnataka** • 2 ♀♀; Bengaluru, Kengeri; 12°57'25" N, 77°31'39" E; elev. 857 m; 19 Apr. 2017; YPT; NIM/NBAIR P5329, P5330. – **Tamil Nadu** • 7 ♀♀; Dindugul, Thandikudi, Regional Coffee Research Station (RCRS); 10°18'34" N, 77°38'34" E; elev. 1305 m; 27 Nov. 2016; YPT; NIM/NBAIR P5331 to P5337 • 7 ♀♀; Lower Pulney Hills, Thadiyankudisai, Horticulture Research Station (HRS); 10°17'58" N, 77°42'42" E; elev. 990 m; 25 Nov. 2016; YPT in forest; NIM/NBAIR P5338 to P5344 • 1 ♀; Yercaud, HRS; 11°47'44" N, 78°12'42" E; elev. 1399 m; 5 Aug. 2016; YPT; NIM/NBAIR P5345 • 3 ♀♀; same data as for preceding; 6 Aug. 2014; YPT in weeds; NIM/NBAIR P5383 to P5385 • 3 ♂♂; same data as for preceding; NIM/NBAIR P5347 to P5349 • 1 ♀; Yelagiri, Thayalur; 12°34'43" N, 78°39'46" E; elev. 1111 m; 15 Jun. 2016; YPT; NIM/NBAIR P5346.

Description

Female

MEASUREMENTS. Body length: 2.30–2.84 mm (n = 10).

COLOUR. Head: black. Mesosoma: mesoscutum, lateral pronotal area, mesopleuron and ventral metapleural area orange-brown, dorsal metapleural area and dorsal propodeum dark brown. Mesoscutellum and metascutellum: red-brown. Horn on T1: black-brown. T1: light yellow. T2: anteriorly light yellow, remainder black-brown. T3–T6: black-brown. Antenna: radicle, A1–A5 yellow-brown, A6 dark brown, remaining antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: predominantly smooth except for coriaceous reticulations towards orbits. Sculpture of ventrolateral frons: smooth with a short

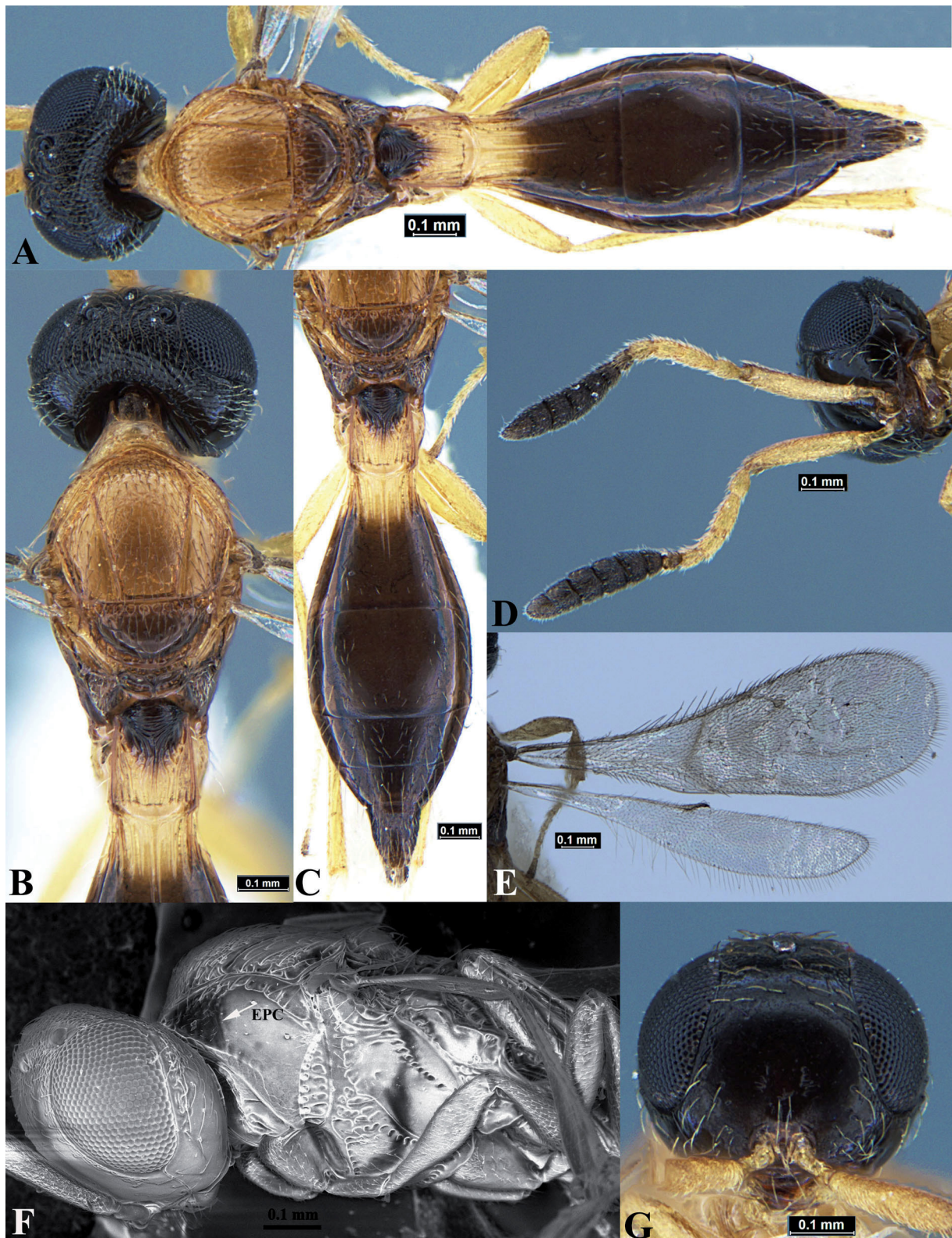


Fig. 26. *Calliscelio rugosus* Rajmohana & Peter, 2012, ♀ (NIM/NBAIR P5329). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antennae. **E.** Wings. **F.** Head and pleura (arrow shows the epomial carina, EPC). **G.** Frons. Scale bars = 0.1 mm.

longitudinal row of irregular foveae on either side of scrobe. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: long and sparse. Hyperoccipital carina: absent. Occipital carina: interrupted medially. Length of OOL: less than $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH distinctly greater than IOS. Central keel: short. Setae on compound eyes: sparse. Sculpture of vertex: anteriorly coriaceous reticulate, ventrally smooth with setigerous punctae. Sculpture of postgena behind outer orbit: smooth with uneven striae. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A4. Shape of A6: longer than wide.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: smooth except for rugose patch medially on inner margin of internotaular area; reticulate-rugose. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: dense. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: smooth. Setation on mesoscutellum: sparse. Scutoscutellar sulcus between notauli: with large round, complete foveae. Sculpture of metascutellum: anteriorly with uneven pits, remainder with two transverse carinae. Shape of metascutellum: posterior margin rounded, approximately $2.5 \times$ as wide as long, extending onto horn of T1. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: weakly rugose. Setation of dorsal propodeum: dense. Sculpture of dorsal pronotal area: almost smooth. Sculpture of lateral pronotal area: smooth. Epomial carina: present, straight; curved. Sculpture of netrion: anteriorly foveate, remainder smooth with a row of foveae. Transverse carinae in dorsal mesopleuron: sparse. Mesopleural carina: present, extending to sternaulus. Mesepimeral sulcus: foveate, joining posterior margin of mesopleuron. Sculpture of ventral mesopleuron: anteriorly and dorsally foveate, remainder smooth. Sculpture of dorsal metapleural area: smooth. Sculpture of ventral metapleural area: foveate, except for smooth area posterodorsally. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: generally weakly infusate without distinct black bands; without infuscation. Basalis: present. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis $> 2 \times$ as long as stigmalis. Setae on submarginalis: long, erect, exceeding anterior margin of wing.

METASOMA. Horn on T1 in female: weakly developed. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1 dorsally: transversely carinate. Sculpture of T1 excluding horn: longitudinally carinate, posteriorly smooth. Sculpture of T2: smooth with anteromedial longitudinal carinae extending beyond half the length of tergite. Sculpture of T3: smooth. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: smooth. Sculpture of T6: with dense setigerous punctae. Shape of T6: less than $1.5 \times$ as long as wide. Sculpture of S3: smooth.

Male (Figs 10C, 11C)

Body length = 2.21–2.45 mm ($n = 3$). Colour: Head black. Mesoscutum brown-red, mesoscutellum and metascutellum black. T1 brown-red, T2 anteriorly yellow, posteriorly brown-black, T3 brown-red, posteriorly black, remaining tergites black. Similar to female but for the filiform antennae and absence of horn on T1. Shape of antennomeres A2–A12: elongate, A3–A4, A11 around $2.2 \times$ as long as wide, A5–A10 approximately $2.8 \times$ as long as wide. Sculpture of T1: anteriorly smooth, remainder entirely longitudinally carinate. Sculpture of T2: longitudinally carinate except for smooth area posteriorly. Sculpture of T3: smooth. Sculpture of T4–T6: smooth. Length of T2: approximately $1.6 \times$ as long as T1 and $1.3 \times$ as long as T3.

Remarks

Type in ZSI, Calicut.

Calliscelio shesha Veenakumari sp. nov.

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Figs 22D, 27

Diagnosis

Calliscelio shesha sp. nov. is similar to *C. agaliensis* and *C. obavvae* sp. nov. but differs from them in having long setae on submarginalis extending beyond the anterior margin of the wing, EH is at least $1.5\times$ greater than IOS, the horn on T1 is smooth and the scutoscuteellar sulcus between notauli is with complete foveae. In the latter two species setae on submarginalis are short, not exceeding the anterior margin of wing, IOS and EH are subequal, horn on T1 is rugose and scutoscuteellar sulcus between notauli is without foveae.

Etymology

This species is named ‘*shesha*’, after the mythical multi-headed serpent believed to be floating on the cosmic ocean of milk, and serving as the divine couch of the Hindu god Vishnu. The name is treated as a noun in apposition.

Material examined

Holotype

INDIA – **Andaman and Nicobar Islands** • ♀; Great Nicobar I., Campbell Bay; 7°00'27" N, 93°56'03" E; elev. 13 m; 22 Mar. 2016; YPT; NIM/NBAIR P5417.

Description

Female

MEASUREMENT. Body length: 2.86 mm ($n = 1$).

COLOUR. Head: black-brown. Mesosoma: black-brown. Horn on T1: black-brown. T1–T6: black-brown. Antenna: radicle, A1–A5 yellow-brown, A6 brown, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: weakly rugose. Sculpture of ventrolateral frons: weakly rugose, with oblique carinae above radicle. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: long and sparse. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: less than $0.5\times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH $1.5\times$ as large as IOS. Central keel: short. Setae on compound eyes: short and sparse. Sculpture of vertex: rugose. Sculpture of postgena behind outer orbit: rugose. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: longer than wide.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: rugose. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: dense. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: entirely rugose except for a smooth area medially. Setation on mesoscutellum: sparse. Scutoscuteellar sulcus between notauli: with complete foveae. Sculpture of metascutellum: anteriorly distinctly foveate, remainder with a transverse and a medial longitudinal carinae, posteriorly with uneven depressions. Shape of metascutellum: posterior margin rounded, not extending onto horn on T1, about $2.3\times$ as wide as long. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: dense. Sculpture of dorsal pronotal area: smooth to weakly rugose. Sculpture of lateral pronotal area: predominantly smooth, with weak reticulations on anterior margin. Epomial carina: absent. Sculpture of netrion: anteriorly

foveate, remainder smooth with sparse punctae. Transverse carinae in dorsal mesopleuron: sparse. Mesopleural carina: present, extending to sternaulus. Mesepimeral sulcus: foveate. Sculpture of ventral mesopleuron: dorsally and anteriorly foveate, remainder smooth. Sculpture of dorsal metapleural area:

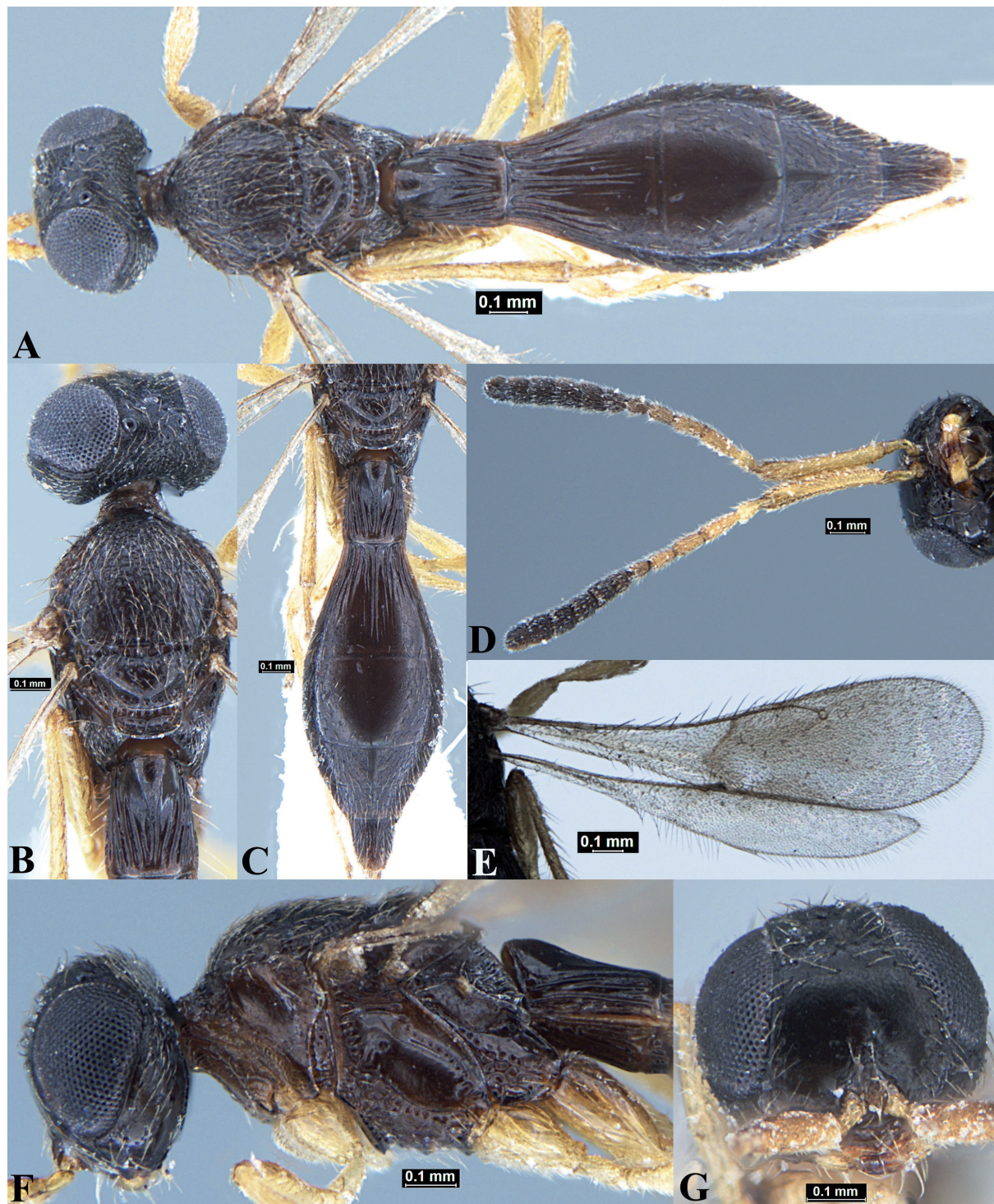


Fig. 27. *Calliscelio shesha* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5417). **A.** Habitus, dorsal view. **B.** Head and mesosoma. **C.** Metasoma. **D.** Antennae. **E.** Wings. **F.** Head and pleura. **G.** Frons. Scale bars = 0.1 mm.

smooth. Sculpture of ventral metapleural area: foveate with a smooth area posterodorsally. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline, with a weak black band present medially. Basalis: present. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis distinctly longer than stigmalis. Setae on submarginalis: long, erect, exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: present as a small bulge. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1 dorsally: smooth. Sculpture of T1 excluding horn: longitudinally carinate, posteromedially smooth. Sculpture of T2: smooth with anteromedial and lateral longitudinal carinae extending almost the entire length of tergite. Sculpture of T3: smooth with setigerous punctae laterally. Relative lengths of T2/T3: T2 longer than T3. Sculpture of T4: medially weakly rugose, remainder smooth with setigerous punctae. Sculpture of T6: anteriorly with weak longitudinal striae, remainder weakly rugose. Shape of A6: longer than wide. Sculpture of S3: smooth.

Male

Unknown.

Calliscelio sundari Veenakumari sp. nov.

urn:lsid:zoobank.org:act:AB102668-4A30-4C8A-AE59-0F146AC3ADBE

Figs 22E, 28

Diagnosis

Calliscelio sundari sp. nov. is similar to *C. elegans* but can be distinguished from it by the presence of the anteriorly truncate horn which is almost as wide as posterior T1; and the hind coxa and A3–A7 are white. In *C. elegans* the horn on T1 is anteriorly rounded and narrower than the posterior width of T1, with the hind coxa and A3–A7 being yellow-brown.

Etymology

The species epithet ‘*sundari*’, means ‘beauty’ in Sanskrit. The name is treated as a noun in apposition.

Material examined

Holotype

INDIA – **Goa** • ♀; Carambolim, Central Coastal Agriculture Research Institute (CCARI), Krishi Vigyana Kendra (KVK); 15°29'53" N, 73°55'25" E; elev. 15 m; 15 Jul. 2015; YPT among weeds; NIM/NBAIR P5401.

Paratypes

INDIA – **Goa** • 4 ♀♀; same data as for holotype; NIM/NBAIR P5402 to P5405.

Description

Female

MEASUREMENTS. Body length: 2.47–2.63 mm (n = 5).

COLOUR. Head: dark brown with orange tint. Mesosoma: dark brown with orange tint. Horn on T1: black. T1: posteriorly black to red-brown. T2: anteriorly white-yellow, posteriorly black-brown. T3–T5: black-brown. T6: anteriorly yellow-white, posteriorly black-brown. Antenna: radicle black-brown, A1 brown, A2 black-brown, A3–A7 white-yellow, remaining antennomeres black. Fore leg: entirely in shades of brown. Mid leg: coxa brown, trochanter white, femur black-brown, anterior tibia white, remainder of tibia black-brown, basitarsi white, other tarsomeres brown. Hind leg: coxa anteriorly white and posteriorly black, trochanter white, femur black, tibia anteriorly white and posteriorly black, basitarsi white, other tarsomeres brown.

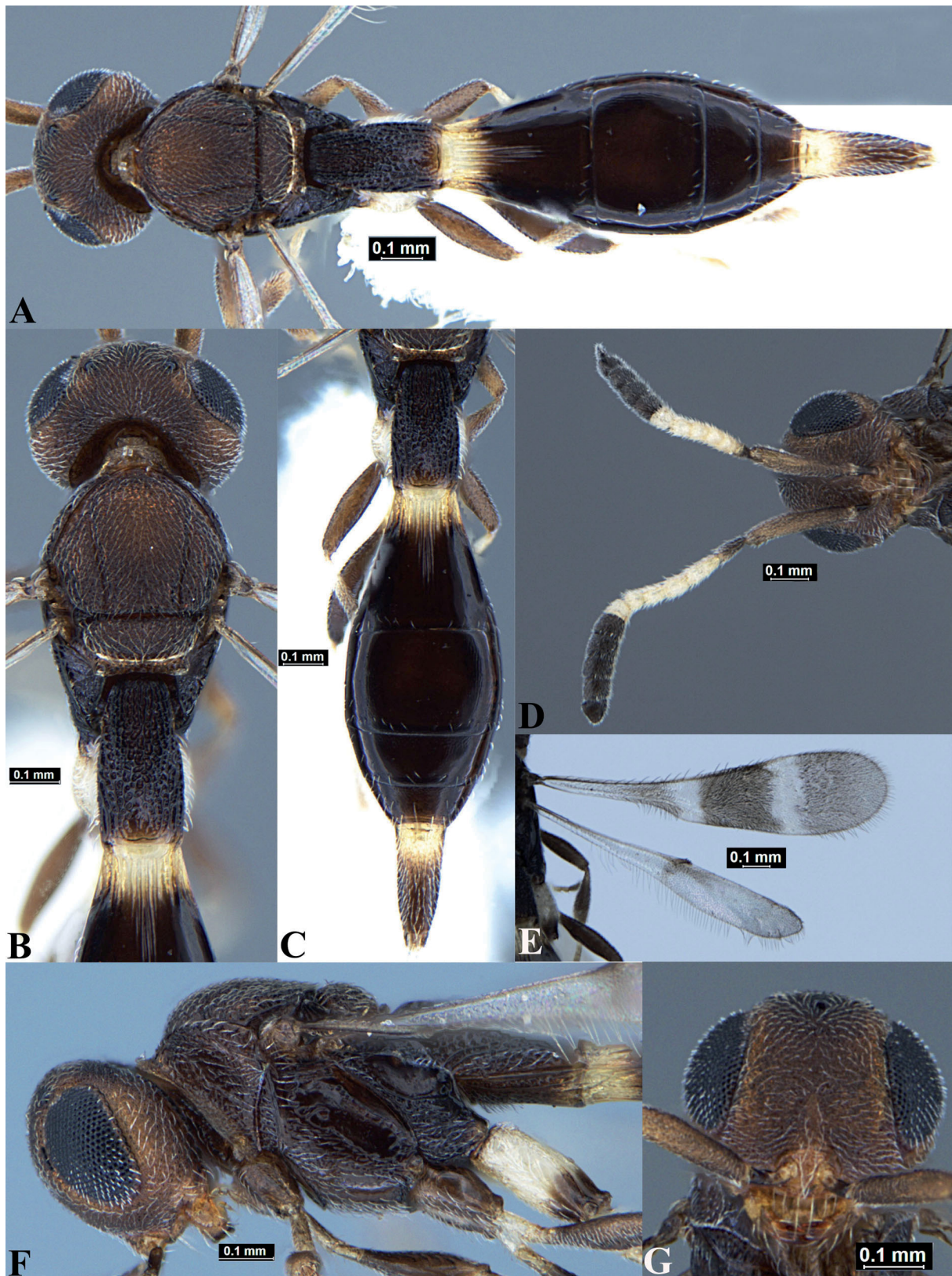


Fig. 28. *Calliscelio sundari* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5401). A. Habitus, dorsal view. B. Head and mesosoma. C. Metasoma. D. Antennae. E. Wings. F. Head and pleura. G. Frons. Scale bars = 0.1 mm.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: granulate. Sculpture of ventrolateral frons: granulate. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: short and dense. Hyperoccipital carina: absent. Occipital carina: complete medially. Length of OOL: less than $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: IOS slightly greater than EH. Central keel: short. Setae on compound eyes: short and dense. Sculpture of vertex: granulate. Sculpture of postgena behind outer orbit: foveate. Sculpture of gena: granulate. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: wider than long.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: granulate. Anterior margin of mesoscutum: weakly rounded. Setation on mesoscutum: dense. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: granulate. Setation on mesoscutellum: dense. Scutoscullar sulcus between notauli: with incomplete foveae. Sculpture of metascutellum: rugose. Shape of metascutellum: weakly concave, not extending onto horn of T1, about $5.8 \times$ as wide as long. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: sparse. Sculpture of dorsal pronotal area: rugose. Sculpture of lateral pronotal area: rugose, with several oblique carinae posteriorly. Epomial carina: absent. Sculpture of netrion: anteriorly foveate, remainder transversely carinate with foveae in between. Transverse carinae in dorsal mesopleuron: dense. Mesopleural carina: present, extending to sternaulus. Mesepimeral sulcus: foveate. Sculpture of ventral mesopleuron: setigerous punctate with transverse smooth areas posteriorly. Sculpture of dorsal metapleural area: almost smooth. Sculpture of ventral metapleural area: foveate with a small, smooth area posterodorsally. Sculpture of hind coxa: smooth to rugose. Base of fore wing and hind wing: attenuate. Colour of fore wing: hyaline, with three, distinct black bands. Basalis: present. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis longer than stigmalis. Setae on submarginalis: long, erect, exceeding the anterior margin of wing in distal half.

METASOMA. Horn on T1 in female: large and distinct. Relative widths of T1 horn and T1: horn as wide as T1. Sculpture of horn on T1 dorsally: with uneven longitudinal carinae. Sculpture of T1 excluding horn: with uneven depressions, laterally with uneven oblique carinae, posteromedially smooth. Sculpture of T2: smooth with anteromedial longitudinal carinae extending beyond half the length of tergite, laterally with sparse longitudinal carinae. Sculpture of T3: medially smooth, sublaterally with weak longitudinal striae. Relative lengths of T2/T3: T2 slightly longer than T3. Sculpture of T4: entirely smooth except for sparse punctae medially and weak reticulations sublaterally. Sculpture of T6: anteriorly reticulate, remainder with dense setigerous punctae. Shape of A6: $2.5 \times$ as long as wide. Sculpture of S3: smooth.

Male

Unknown.

Calliscelio ulupi Veenakumari sp. nov.

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Figs 22F, 29

Diagnosis

Calliscelio ulupi sp. nov. is close to *C. glabratus* and *C. pinaki* sp. nov. It differs from the latter two species in having a non-lamellate metascutellum; and T4 and T5 are $>3.6 \times$ as wide as long. In the latter two species the metascutellum is posteromedially lamellate and extend on to horn on T1; and T4 and T5, are at most $2.4 \times$ as wide as long.

Etymology

This species is named after ‘Ulupi’, a Naga (divine serpent) princess, one of Arjuna’s (the third, of the five Pandava brothers in the Hindu epic Mahabharata) wives. The name is treated as a noun in apposition.

Material examined

Holotype

INDIA – **Tamil Nadu** • ♀; Coimbatore, Valparai, Uralikkal; 10°19’47” N, 76°53’32” E; elev. 1068 m; 17 Apr. 2016; YPT in weeds; NIM/NBAIR P5418.

Paratypes

INDIA – **Andaman and Nicobar Islands** • 1 ♀; Little Andaman, Harminder Bay; 10°34’08” N, 92°33’16” E; elev. 46 m; 29 Jan. 2013; SN; NIM/NBAIR P5439 • 1 ♀; South Andaman, Bloomsdale; 11°38’25” N, 92°39’40” E; elev. 10 m; 26 Mar. 2016; YPT; NIM/NBAIR P5440. – **Karnataka** • 1 ♂; Bengaluru; IWST; 13°00’40” N, 77°34’12” E, elev. 942 m; 24 Jan. 2013; YPT; NIM/NBAIR P5441. – **Tamil Nadu** • 4 ♀♀; Yercaud, HRS; 11°47’44” N, 78°12’42” E; elev. 1399 m; 6 Aug. 2016; YPT in medicinal plants garden; NIM/NBAIR P55419 to P5422 • 1 ♀; Coimbatore, Valparai, United Planters’ Association of Southern India (UPASI); 11°20’33” N, 76°48’07” E, elev. 1073 m; 3 Jul. 2014; YPT in grass (Poaceae); NIM/NBAIR P5423 • 7 ♀♀; Lower Pulney Hills, Thadiyankudisai, HRS; 10°17’58” N, 77°42’42” E; elev. 990 m; 25–27 Nov. 2016; YPT; NIM/NBAIR P5424 to P5429, P5438 • 4 ♀♀; Dindugul, Thandikudi, Regional Coffee Research Station (RCRS); 10°18’34” N, 77°38’34” E; elev. 1305 m; 27 Nov. 2016; YPT; NIM/NBAIR P5434 to P5437. – **Uttar Pradesh** • 4 ♀♀; Aligarh, Akraabad; 27°48’29” N, 78°16’11” E; elev. 1210 m; 8 Mar. 2013; SN; NIM/NBAIR P5430 to P5433.

Description

Female

MEASUREMENTS. Body length: 2.31–2.87 mm (n = 10).

COLOUR. Head: black. Mesosoma: mesoscutum and mesoscutellum brown-red, metascutellum, dorsal propodeum and pleuron light brown. Horn on T1: brown. T1: brown-red. T2: anteriorly light brown, remainder brown-red. T3: brown-red. T4–T6: brown-black. Antenna: radicle, A1–A4 light brown, A5–A6 dark brown, other antennomeres black-brown. Legs: yellow-brown.

HEAD. Shape of head: subglobose. Sculpture of frons below median ocellus: smooth. Sculpture of ventrolateral frons: smooth. Striae on lower frons: absent. Frontal carina below median ocellus: absent. Setation of upper frons: long and sparse. Hyperoccipital carina: absent. Occipital carina: interrupted medially. Length of OOL: less than $0.5 \times$ ocellar diameter. Inner orbits: diverging ventrally. IOS/EH: EH distinctly greater than IOS. Central keel: absent. Setae on compound eyes: short. Sculpture of vertex: rugose with setigerous punctae. Sculpture of postgena behind outer orbit: foveate. Sculpture of gena: smooth. Number of teeth on mandible: three, subequal in size. Length of A2: shorter than A3. Length of A4: shorter than A3. Length of A5: shorter than A3. Shape of A6: as long as wide.

MESOSOMA. Length and width of mesoscutum: wider than long. Sculpture of mesoscutum: weakly rugose. Anterior margin of mesoscutum: pointed. Setation on mesoscutum: sparse. Length and width of mesoscutellum: wider than long. Sculpture of mesoscutellum: entirely weakly rugose except for a smooth patch medially. Setation on mesoscutellum: sparse. Scutoscuteellar sulcus between notauli: with complete foveae. Sculpture of metascutellum: entirely smooth. Shape of metascutellum: posterior margin rounded, about $2.5 \times$ as wide as long, not extending onto horn of T1. Dorsal propodeum: excavate medially, with lateral propodeal carinae widely separated to accommodate horn on T1. Lateral propodeal carina: absent. Sculpture of dorsal propodeum: rugose. Setation of dorsal propodeum: dense. Sculpture of dorsal pronotal area: smooth to rugose. Sculpture of lateral pronotal area: smooth. Epomial carina: absent. Sculpture of

netrion: weakly rugose. Transverse carinae in dorsal mesopleuron: sparse. Mesopleural carina: present, extending to sternaulus. Mesepimeral sulcus: weakly foveate. Sculpture of ventral mesopleuron: smooth except for foveae anteriorly and dorsally. Sculpture of dorsal metapleural area: smooth to weakly rugose. Sculpture of ventral metapleural area: rugose-foveate, with a smooth area posterodorsally. Sculpture of hind coxa: smooth. Base of fore wing and hind wing: wide. Colour of fore wing: hyaline, with a weak

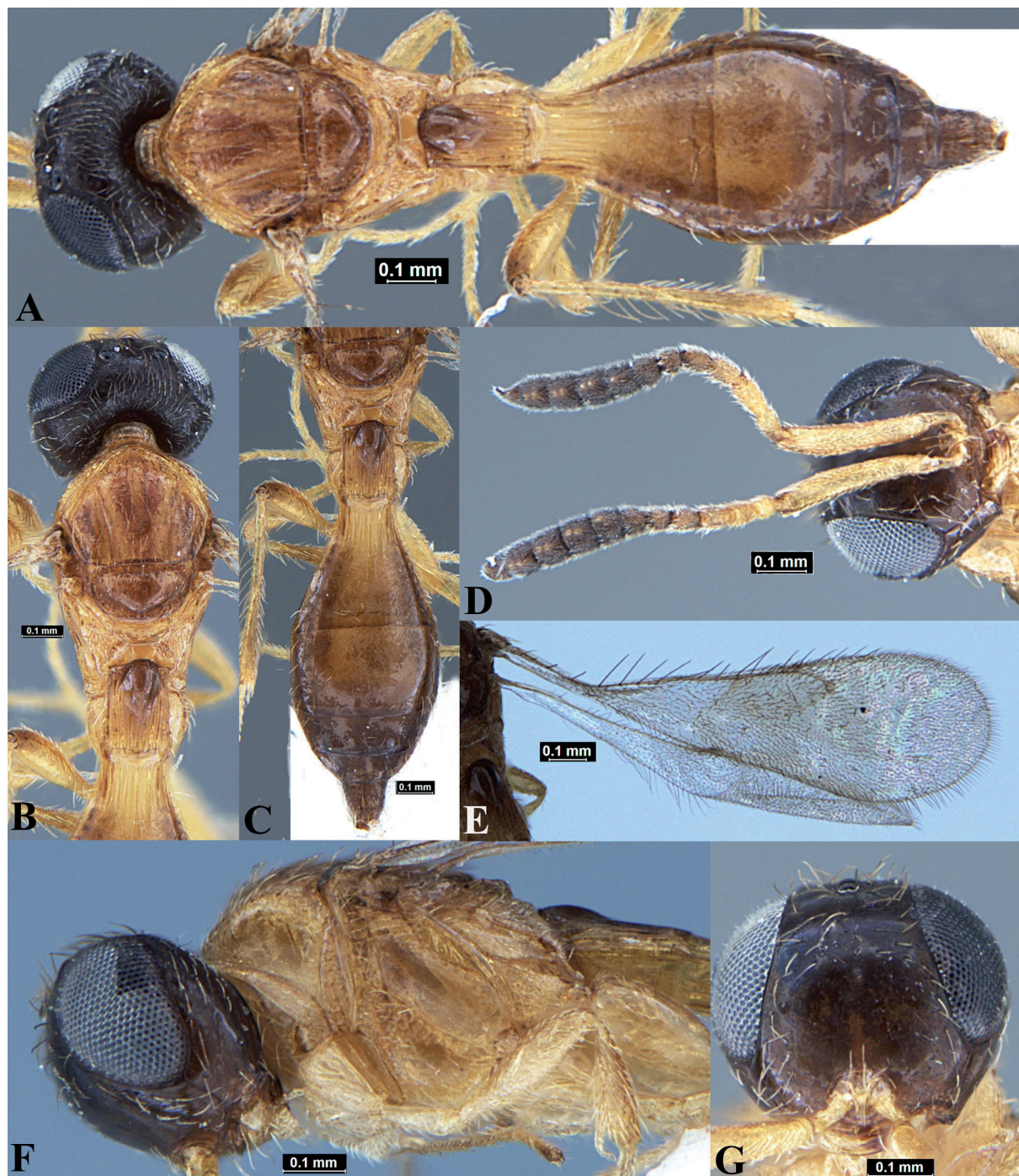


Fig. 29. *Calliscelio ulupi* Veenakumari sp. nov., holotype, ♀ (NIM/NBAIR P5418). A. Habitus, dorsal view. B. Head and mesosoma. C. Metasoma. D. Antennae. E. Wings. F. Head and pleura. G. Frons. Scale bars = 0.1 mm.

black band present medially. Basalis: absent. Length of marginalis: distinctly shorter than postmarginalis and stigmalis. Relative lengths of postmarginalis and stigmalis: postmarginalis distinctly longer than stigmalis. Setae on submarginalis: long, erect, exceeding the anterior margin of wing.

METASOMA. Horn on T1 in female: large distinct. Relative widths of T1 horn and T1 : T1 wider than horn. Sculpture of horn on T1 dorsally: smooth. Sculpture of T1 excluding horn: longitudinally carinate, posteriorly smooth. Sculpture of T2: smooth with anteromedial longitudinal carinae extending half the length of tergite; punctate laterally. Sculpture of T3: predominantly smooth; smooth with punctate laterally. Relative lengths of T2/T3: T2 distinctly longer than T3. Sculpture of T4: smooth. Sculpture of T6: smooth. Shape of A6: as wide as long. Sculpture of S3: smooth.

Male (Figs 10D, 11D)

Body length = 2.13 mm (n = 1). Colour: head black. Mesoscutum and mesoscutellum brown-red, metascutellum, propodeum, T1 brown. T2–T3 yellow-brown. T4–T7 brown-red. Radicle, A1, A2 brown, remaining antennomeres brown-black. Similar to female but for the filiform antennae and absence of horn on T1. Shape of antennomeres A2–A11: elongate. Length of A3, A4, A10, A11: approximately $2.4 \times$ as long as wide. Length of remaining flagellomeres (except A12): around $2.7 \times$ as long as wide. Sculpture of T1: anteriorly smooth, remainder entirely longitudinal carinate. Sculpture of T2: longitudinally carinate except for smooth area posteriorly. Sculpture of T3: smooth. Sculpture of T4–T7: smooth. Length of T2: approximately $1.6 \times$ as long as T1 and $1.3 \times$ as long as T3.

Dicroscelio emarginatus (Narendran & Ramesh Babu, 1999) comb. nov.

Fig. 30

Calliscelio emarginatus Narendran & Ramesh Babu, 1999: 2, 5, fig. 5.

Calliscelio emarginatus – Rajmohana 2006: 120–121.

Material examined

Holotype

INDIA – **Kerala** • ♀; C.U. (Calicut University) campus; 14 Jan.1989; Narendran and party leg.; ZSI RB 639, 1316.

Remarks

This species is transferred from *Calliscelio* to *Dicroscelio* Kieffer, 1913. The presence of facial and malar striae, as well as the narrow angle between postmarginalis and stigmalis assigns this species to *Dicroscelio*.

Type in ZSI, Calicut.

***Calliscelio elegans* species group**

A new species group – the *elegans* species group – is proposed which is quite distinct from other species of *Calliscelio* possessing the following unique combination of character states: 1. Fore wing with three black bands. 2. Metascutellum extremely narrow. 3. Head and mesonotum with granular sculpture. Two species – *C. elegans* and *C. sundari* sp. nov. – are included in this species group.

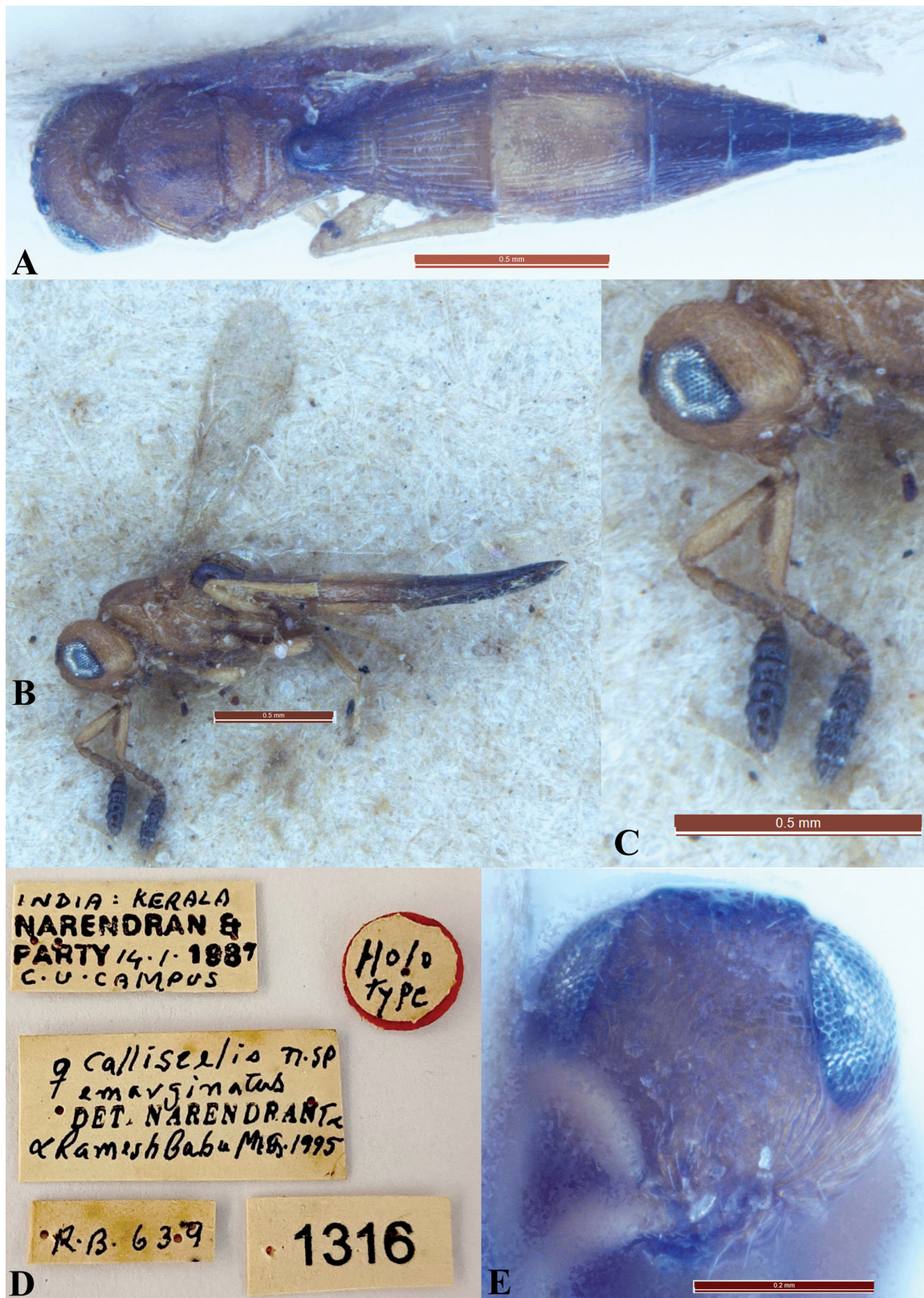


Fig. 30. *Dicrosselio emarginatus* (Narendran & Ramesh Babu, 1999) comb. nov., ♀ (ZSI RB 639, 1316). A. Habitus, dorsal view. B. Habitus, lateral view. C. Head and antennae. D. Type labels. E. Frons. Photos: ©ZSI, Calicut, P. Girish Kumar.

Discussion

The Indian species have been collected from varied ecosystems from different parts of the country, including riparian and coastal habitats, inland forests, hilly tracts, and cultivated areas (with both perennial and annual crops) suggesting that at least some species may be ecological generalists.

This study considerably increases the number of species of *Calliscelio* known from the Indian region, with India by far outstripping in species richness the other parts of the Oriental region from where *Calliscelio* have so far been studied. It is possible that Southeast Asia could outstrip India in species richness in this genus as rich collections from there await formal taxonomic studies.

Johnson *et al.* (2018) suggested that forming species groups could be an initial step in the study of widely dispersed, diverse genera. Masner (1976) mentioned that *Calliscelio* could be broadly divided into two major groups. The first group consisting of a few species primarily from the Neotropical region are similar to *C. laticinctus* and are characterized by the presence of an elongate marginalis, spurious basalis, horn on T1 either moderate or inconspicuous, and metanotum not lamellicate, but weakly expanded medially. While the other group, into which the majority of *Calliscelio* fall, is characterized by the presence of a short marginalis, no basalis, and horn on T1 conspicuous, covered at times by the lamella of the metanotum. The Indian species of *Calliscelio* fall into the latter group, in some of which the basalis is prominent.

Though Chen *et al.* (2017) reported 42 species (38 new species) from the New World, no species groups were proposed. It was only in 2024 that Popovici *et al.* proposed and designated the first species group in *Calliscelio*: the *Calliscelio erana* species group characterized by the presence of bidentate mandibles – a rare condition in *Calliscelio*, found in *C. erana* (Nixon, 1931), *C. aphrodite* (Nixon, 1933), and *C. rungu* Talamas & Copeland, 2024 from Africa; and *C. safavii* Popovici & Talamas, 2024 from Iran. The Indian species *C. brennanae* sp. nov., *C. indicus* and *C. orientalis* characterized by the presence of bidentate mandibles fall into this species group.

A new species group, the *elegans* species group, is now proposed comprising the two species *C. elegans* and *C. sundari* sp. nov.

Calliscelio coromandelensis has been excluded here as the presence of a bidentate metascutellum indicates that it is not a member of *Calliscelio*. Two Vietnamese species *C. urgo* and *C. tiro* are synonymized with Indian species, while *Calliscelio emarginatus* is transferred from *Calliscelio* to *Dicroscelio*.

Although studies on Platygastroidea have resulted in the progressive addition of new species, the rate of discovery has been slow as compared to its expected diversity, with many higher taxa within the superfamily remaining understudied. As climate change and habitat destruction proceed apace the need to focus increasing attention on the lesser studied taxa in the group is of the greatest urgency.

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