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Monograph

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The genus *Phanerotomella* Szépligeti (Insecta, Hymenoptera, Braconidae, Cheloninae) from China, with descriptions of sixteen new species

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Abstract. The genus *Phanerotomella* Szépligeti, 1900 (Insecta, Hymenoptera, Braconidae, Cheloninae) is revised for China, including 42 species. A total of 16 new species are described: *P. annulata* sp. nov., *P. atratoides* sp. nov., *P. aurantisoma* sp. nov., *P. brevifemorata* sp. nov., *P. digitata* sp. nov., *P. distenticornis* sp. nov., *P. emeiensis* sp. nov., *P. exilicornis* sp. nov., *P. flavigena* sp. nov., *P. fulgida* sp. nov., *P. fuscitibialis* sp. nov., *P. nigrisoma* sp. nov., *P. rugifera* sp. nov., *P. rugulosa* sp. nov., *P. tenuipes* sp. nov., and *P. xui* sp. nov. Eight species are newly recorded for China: *P. albiscapa* (Ashmead, 1905), *P. barbieri* Sigwalt, 1978, *P. bellula* Papp, 1989, *P. bisulcata* (Herrich-Schäffer, 1838), *P. collinsi* Zettel, 1989, *P. hawaiiensis* (Ashmead, 1901), *P. mellivena* van Achterberg nom. nov., and *P. yemenitica* van Achterberg, 2021. Seven new synonyms are proposed: *P. gracilimandiblis* Chen & Ji, 2003 is synonymised with *P. bicolorata* He & Chen, 1995; *P. longieyes* Chen & Ji, 2003 and *P. picticornis* Chen & Ji, 2003 are synonymised with *P. collinsi* Zettel, 1989; *P. longipedes* Chen & Ji, 2003 is synonymised with *P. taiwanensis* Zettel, 1989; *P. rugifrontatus* Chen & Ji, 2003 is synonymised with *P. bellula* Papp, 1989; *P. variareolata* Belokobylskij, 1986 is synonymised with *P. pulchra* Fahringer, 1934; and *P. flava* Lăcătușu, 1963 is synonymised with *P. rufa* (Marshall, 1898), while *P. flava* Zettel, 1989 is renamed *P. mellivena* van Achterberg nom. nov.

Keywords. Revision, key, new name, new taxon, new record, new synonymy.

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Introduction

The genus *Phanerotomella* Szépligeti, 1900 belongs to the order Hymenoptera Linnaeus, 1758, family Braconidae Nees, 1811, and subfamily Cheloninae Foerster, 1863. It is a moderately-sized genus with about 90 species and known from all zoological realms except the Nearctic and Neotropical regions. Szépligeti (1900a) established *Phanerotomella* with two new species from New Guinea: *P. longipes* Szépligeti, 1900 and *P. sculpturata* Szépligeti, 1900. *Phanerotomella longipes* was later designated as the type species of this genus by Viereck (1914). Zettel (1989) conducted a comprehensive revision of *Phanerotomella* worldwide, which much facilitated our research.

The exploration of *Phanerotomella* in China began in 1934 with Fahringer's description of a species from Jiangsu, namely *P. pulchra* Fahringer, 1934. However, research on this genus in China remained stagnant for 55 years until Zettel (1989) reported four species from Taiwan and Guangdong, viz. *P. taiwanensis* Zettel, 1989, *P. townesi* Zettel, 1989, *P. sinensis* Zettel, 1989, and *P. bouceki* Zettel, 1989. Since then, the study of this genus in China has developed rapidly. He *et al.* (1995, 2001) reported three new species of *Phanerotomella* from Zhejiang and Xizang, viz. *P. zhejiangensis* He & Chen, 1995, *P. bicolorata* He & Chen, 1995 and *P. xizangensis* He & Chen, 2001. Chen & Ji (2003) conducted a systematic study of *Phanerotomella* in China, finding a total of 25 species with 12 new species and five new records. However, it has been over 20 years since the last systematic study of the Chinese fauna. Prior to the present study, 25 species of the genus *Phanerotomella* have been identified in China, distributed in 12 provinces: Fujian, Guangdong, Hainan, Hubei, Jiangsu, Jilin, Taiwan, Xizang, Yunnan, Hunan, Guangxi and Zhejiang (Appendix, green colour).

The hosts of *Phanerotomella* are largely unknown, with only *P. hawaiiensis* (Ashmead, 1901) known to parasitize the larvae of *Stoerberhinus testaceus* Butler, 1881 (Lepidoptera: Autostichidae). Cheloninae wasps are endoparasitoids of lepidopteran larvae, and several species are crucial in the natural control of agricultural pests. The parasitoid *Chelonus blackburni* Cameron, 1886, was successfully introduced from Hawaii to the mainland United States and Mexico between 1932 and 1944 to control the cotton pest *Pectinophora gossypiella* (Saunders, 1844) (Lepidoptera: Gelechiidae) (references in Shenefelt 1973). This suggests that Cheloninae may have good prospects for application in biological control.

China spans a vast territory of the Eastern Palaearctic and Oriental regions, with complex environments and diverse climates, rich in species resources. However, due to the short research history and limited systematic studies of *Phanerotomella* in China, the previous number of species (n=25) is small, considering the size of the country. In addition, the distribution of this genus within the country is poorly known. This study aims to not only explore and clarify the species and distribution of *Phanerotomella* in China, but also provide a foundation for biological control, natural resource management, and entomofaunistic studies.

Material and methods

The examined specimens are deposited in the Parasitic Hymenoptera Collection of Zhejiang University, Hangzhou (ZJUH) and the Institute of Zoology, Chinese Academy of Science, Beijing (IZCAS). Some specimens originated from the insect collection of Northwest University, Xi'an (NWUX). The morphological terminology used in this paper follows that of van Achterberg (1988, 1993) and He *et al.* (2000). All descriptions and measurements were made under a stereo microscope (Nikon SMZ800N) and photos taken with a digital camera (Keyence VHX-70000).

The abbreviations of morphological terms are as follows:

OOL = shortest distance from a posterior ocellus to nearest eye margin

OD = maximum diameter of posterior ocellus

POL = minimum width between posterior ocelli

During our examination of this genus, we identified four important key characters: antenna widened medially or not; subapical segments moniliform or non-moniliform; antenna colour; and vein m-cu postfurcal or antefurcal. We add some speculations about the relationship between morphology and physiological functions. Understanding these relationships will help us select important and correct taxonomic characters.

The antennae of parasitoid wasps play crucial roles in host recognition and intra-species communication. Antennae which are widened medially and have moniliform subapical segments allow for the distribution of more olfactory and tactile receptors as well as glands that secrete chemical signals. After inspecting the specimens of *Phanerotomella*, we found that the antennae of larger species are generally long and slender, while smaller species are more likely to have antennae widened medially and moniliform subapically. We speculate that when smaller species attack larger or defensive hosts, they require a higher richness and sensitivity of the antennal receptors. Smaller species generally have shorter antennae; therefore, they have likely adapted through evolutionary processes by developing more widened and moniliform segments in their short antennae to accommodate for these receptors.

Colour is generally considered an unstable characteristic. However, after inspecting all the specimens, we found that the colour of the female antennae remains stable within the species. We speculate that the unique colour of the antennae helps in identifying conspecifics during close contact. In addition, we speculate that the bright colours on the metasomal carapace and hind legs may serve as a warning and have a defensive function during parasitism.

Differences in wing veins can cause the wings to deform in different directions and degrees to adapt to flight in various environments. When the fore wing vein m-cu is distinctly postfurcal, the posterior margin of the wing has a tendency to curl forward, which helps adjust the flight posture for flexible turning. When fore wing vein m-cu is antefurcal, the wing is relatively difficult to curl, which helps maintain flight stability for rapid shuttling. After inspecting all the specimens, we found that most species ($\frac{3}{4}$ of the total) have vein m-cu postfurcal and they are of medium to large size (about 3–6 mm). We speculate that they have a considerable inertia during flight and are not able to easily change direction, so they need vein m-cu to be postfurcal to augment flying flexibility.

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Family Braconidae Nees, 1811
Subfamily Cheloninae Foerster, 1863
Genus *Phanerotomella* Szépligeti, 1900

Phanerotomella albiscapa (Ashmead, 1905)

Figs 1–2

Phanerotoma albiscapa Ashmead, 1905: 968.

Phanerotomella albiscapa – Viereck 1913: 365. — Baltazar 1966: 30. — Shenefelt 1973: 929. — Sigwalt 1978: 723. — Zettel 1989: 25, 45–47.

Diagnosis

Scapus and pedicellus in lateral view brown and not different to brown flagellum (Fig. 2D–E); mesopleuron punctate-reticulate and with distinctly smooth area posteriorly (Fig. 2K); lamella of third metasomal tergite more protruding medio-apically (Fig. 2F); clypeus in lateral view strongly protruding (Fig. 2C); temple superficially rugulose and shiny (Fig. 2C).

Material examined (3 ♀♀)

CHINA – **Sichuan** • 1 ♀; Wolong National Nature Reserve; 21 Jul. 2006; H.Y. Zhang leg.; ZJUH No. 200612241. – **Yunnan** • 1 ♀; Bazhai, Yudong Reservoir; Jun. 2017; Z. Liu leg.; ZJUH No. 202307885 • 1 ♀; Xishuangbanna; 21°45.080' N, 100°26.627' E; elev. 1677 m; 17 May–21 Jun. 2018; Malaise trap; ZJUH No. 201805724.

Host

Unknown.

Distribution

China (Sichuan, Yunnan), Philippines.

Remarks

The holotype female (USNMENT 00809525) from the Philippines (Manila) was examined and redescribed by Zettel (1989) and the photos on the USNM website (<https://naturalhistory.si.edu>)



Fig. 1. *Phanerotomella albiscapa* (Ashmead, 1905), China, ♀ (ZJUH No. 202307885), habitus, lateral view. Scale bar: 1.0 mm.

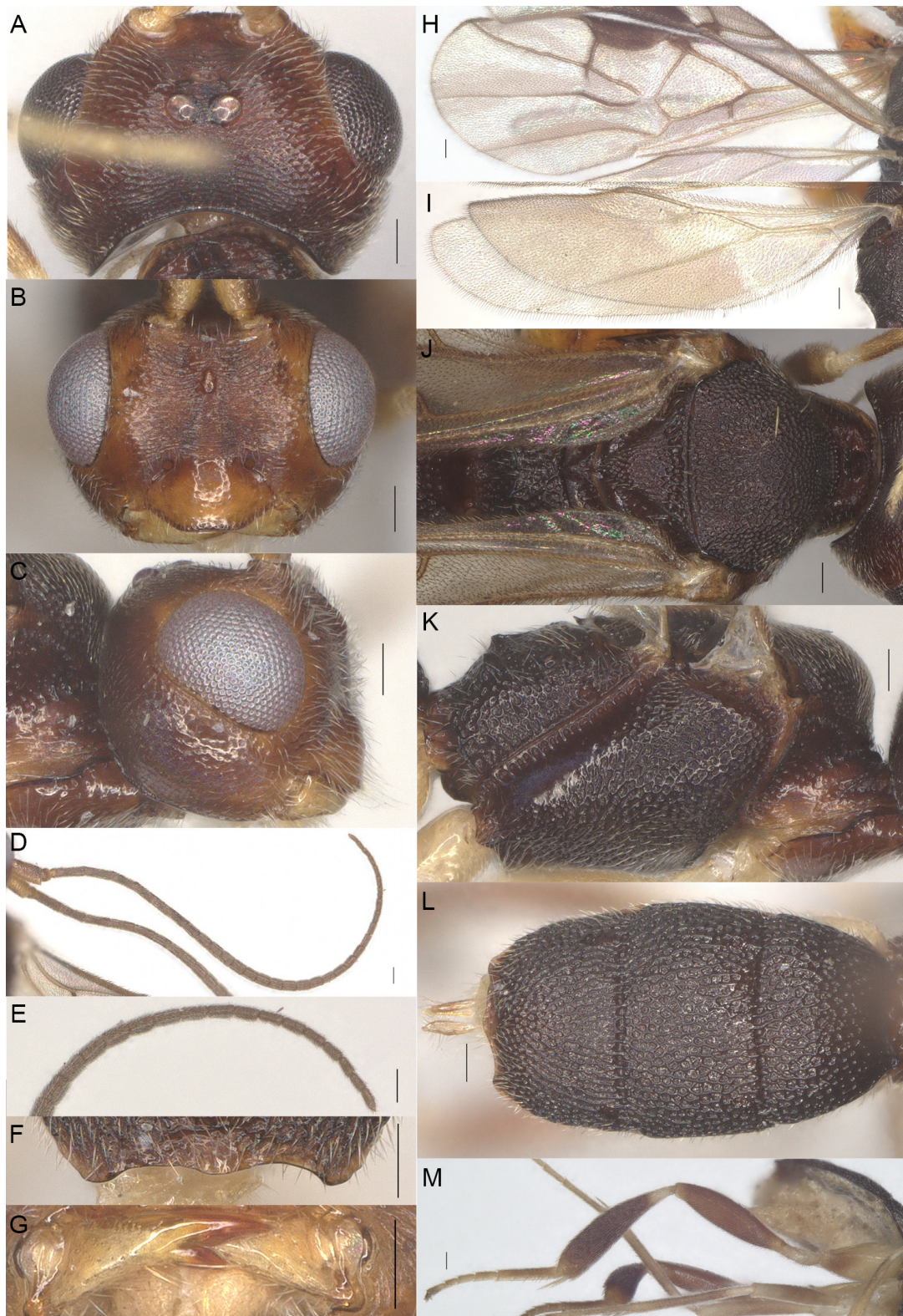


Fig. 2. *Phanerotomella albiscapa* (Ashmead, 1905), China. **A, J.** ♀ (ZJUH No. 200807665). **B–I, K–M.** ♀ (ZJUH No. 202307885). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Apical antenna, lateral view. **F.** Lamella, posterior view. **G.** Mandible, ventral view. **H.** Fore wing. **I.** Hind wing. **J.** Mesosoma, dorsal view. **K.** Mesosoma, lateral view. **L.** Metasoma, dorsal view. **M.** Hind leg. Scale bars: 0.1 mm.

were examined. The three females reported here agree with the description of *P. albiscapa* except for colouration of scapus and pedicellus (infuscate laterally vs white for the types).

***Phanerotomella annulata* sp. nov.**

[urn:lsid:zoobank.org:act:9E70E5D4-D512-417A-A927-E605D6365A9C](https://zoobank.org/urn:lsid:zoobank.org:act:9E70E5D4-D512-417A-A927-E605D6365A9C)

Figs 3–4

Diagnosis

Antenna with white band on 10th–12th segments (Fig. 4K); mandible basal half blackish and apical half yellowish and with reddish teeth (Fig. 4D); hind femur slender, 5.6 × as long as wide (Fig. 4F); body length about 5.3 mm (Fig. 3); body black (Fig. 3); hind femur black and hind tibia black except basally white (Fig. 4F).

Etymology

Named after white antennal band; ‘*annulatus*’ is Latin for ‘ringed’.

Type material

Holotype

CHINA – Xizang • ♀; Linzhi, Yigong Tea Farm; 3 Aug. 2019; Zekai Li leg.; ZJUH No. 202307798.



Fig. 3. *Phanerotomella annulata* sp. nov., holotype, ♀ (ZJUH No. 202307798), habitus, lateral view. Scale bar: 1.0 mm.

Description

Female

MEASUREMENTS. Length of body 5.0 mm, fore wing 4.9 mm.

COLOURATION. Black; metasoma ventrally white or ivory; antenna black except for white band of 10th–12th segments; mandible basal half blackish and apical half yellowish and with reddish teeth; fore and middle legs black except coxa, trochanter and tibia basally white; hind leg black except basal third of coxa, trochanter, tibia basally and first to third tarsal segments white; wing veins blackish brown, pterostigma and parastigma black.

HEAD (Fig. 4A–C). Width $1.4 \times$ median length in anterior view (Fig. 4B) and part of head above eye in lateral view $0.4 \times$ height of eye (Fig. 4C); antenna with 52 segments and $1.6 \times$ as long as fore wing, not widened but shortened medially, gradually narrowing apically, subapical segments non-moniliform and slightly longer than wide, third, fourth, tenth, fifteenth and penultimate segments 4.0 , 3.8 , 1.9 , 1.2 and $1.8 \times$ as long as wide in lateral view, respectively (Fig. 4K–L); area of stemmaticum transversely striate; OOL:OD:POL = $3:1:1$; length of eye $0.9 \times$ temple in dorsal view (Fig. 4A); frons transversely rugulose and with median carina; vertex reticulate-rugose with short setae; temple densely punctate and shiny; face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus finely punctate and with shiny interspaces, truncate medio-ventrally; eye width in lateral view $0.7 \times$ maximum width of temple (Fig. 4C), eye height in anterior view $0.6 \times$ minimum width of face (Fig. 4B); malar space rugulose and $1.2 \times$ as long as basal width of mandible; mandible rather robust, lower tooth of mandible $0.8 \times$ as long as apical tooth (Fig. 4D); face width $0.9 \times$ height of face and clypeus together.

MESOSOMA (Fig. 4H–I). Length $1.4 \times$ its width in lateral view (Fig. 4I); side of pronotum superficially punctate; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with six short crenulae (Fig. 4H); scutellum punctate; mesopleuron distinctly punctate and with smooth and shiny area posteriorly, with distinct and complete precoxal sulcus; propodeum reticulate, without median carina, with irregular transverse carina connected to four distinct and blunt lateral tubercles.

WINGS (Fig. 4G). Fore wing $3.0 \times$ as long as its maximum width; second submarginal cell sessile; vein m-cu distinctly postfurcal; vein r and vein SR1 straight; vein 1-SR+M concave; length of 1-R1 $1.2 \times$ pterostigma; vein r issued far beyond middle of pterostigma, $1.0 \times$ vein r-m; r:2-SR:SR1 = $12:31:52$; vein 1-CU1 $0.2 \times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m = $20:31:9$.

LEGS (Fig. 4F). Hind femur $5.6 \times$ as long as wide; longest spur of hind tibia $0.4 \times$ its basitarsus; hind leg smooth and shiny except fine and superficial punctation; hind tibia slender; middle tibia without ivory blister.

METASOMA (Fig. 4E, J). Oval in dorsal view (Fig. 4J), carapace $1.8 \times$ as long as wide and as long as mesosoma; first to third tergites densely reticulate-rugose; third tergite $0.8 \times$ as long as second tergite, medial length of third tergite $0.5 \times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of medium-sized and blunt tubercles latero-apically (Fig. 4E).

Male

Unknown.

Host

Unknown.

Distribution

China (Xizang).

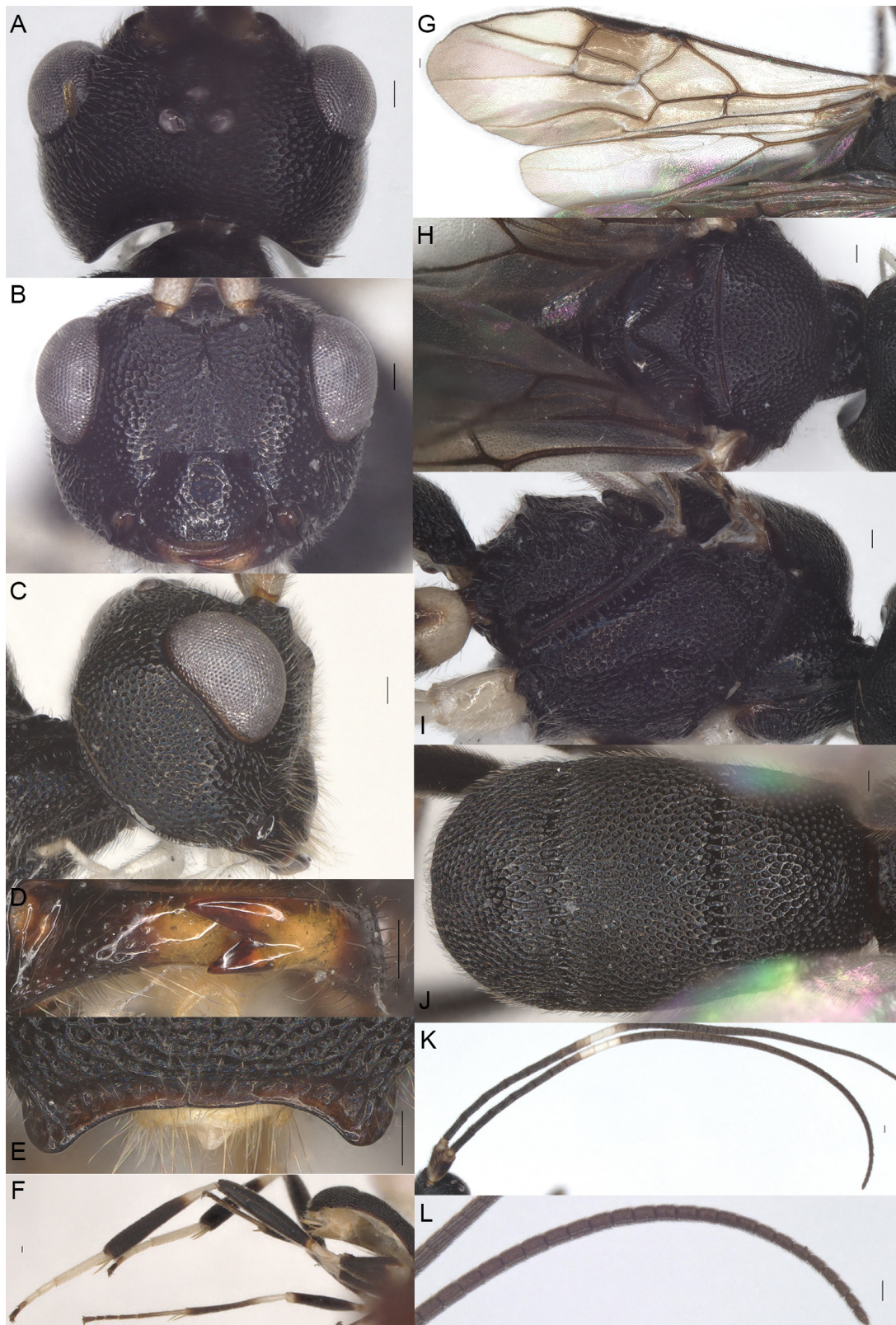


Fig. 4. *Phanerotomella annulata* sp. nov., holotype, ♀ (ZJUH No. 202307798). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

Remarks

Phanerotomella annulata sp. nov. is similar to *P. taiwanensis* in having a similar colouration of the body and hind femur. However, *Phanerotomella annulata* can be easily distinguished from *P. taiwanensis* by having an antenna with a white band on the 10th–12th segments (antenna with white band on 3rd–4th segments in the latter), the hind femur 5.6× as long as wide (4.7× in the latter), the more robust mandible and an inner tooth 0.7× as long as apical tooth (slender and 0.5× in the latter), and the mandible basal half black and apical half yellow (mandible yellow in the latter).

Phanerotomella apetila Chen & Ji, 2003

Figs 5–6

Phanerotomella apertilus Chen & Ji, 2003: 180–182, 229–230.



Fig. 5. *Phanerotomella apetila* Chen & Ji, 2003, China, ♀ (ZJUH No. 20000173), habitus, lateral view. Scale bar: 1.0 mm.

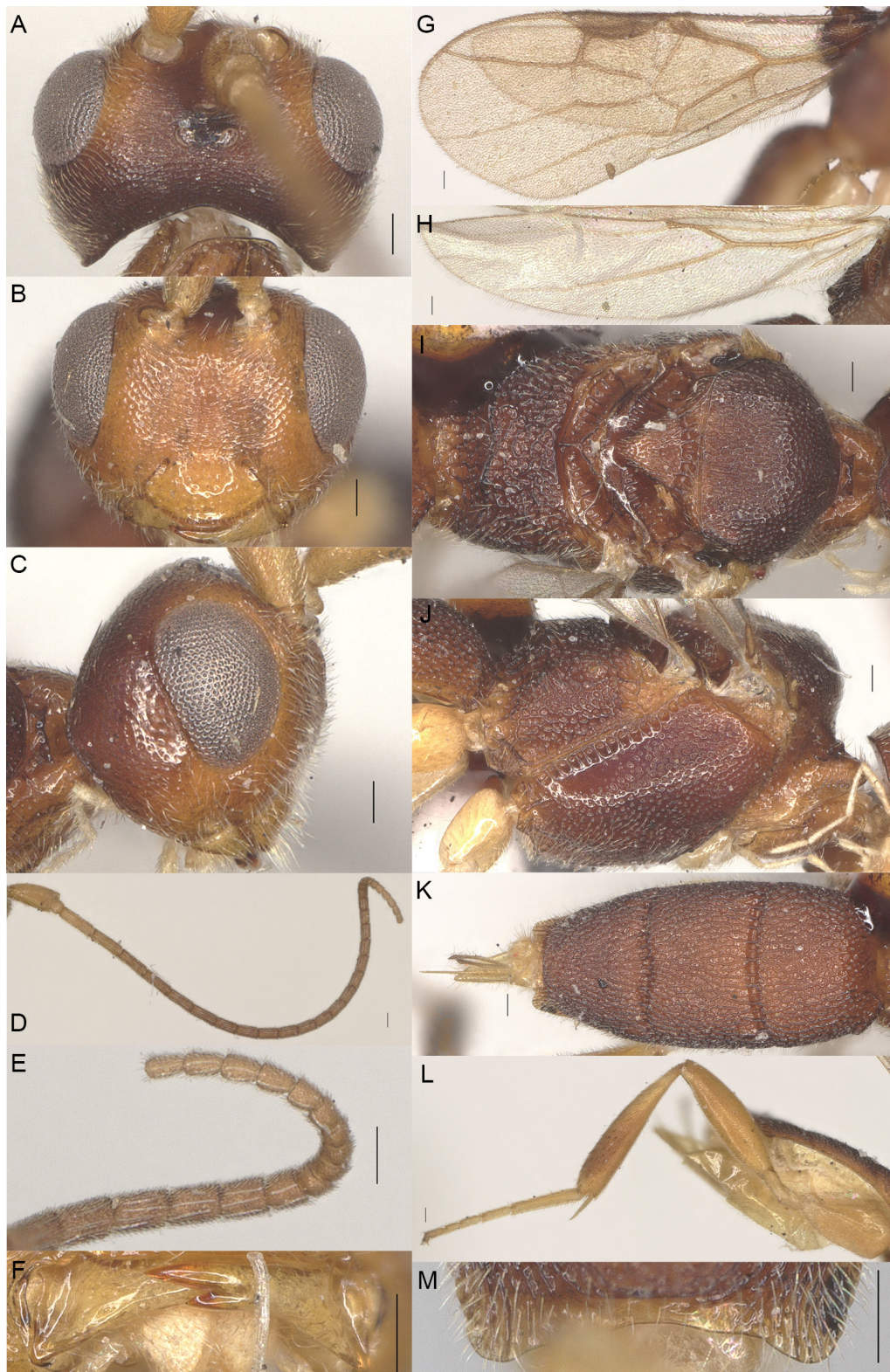


Fig. 6. *Phanerotomella apetila* Chen & Ji, 2003, China. **A–F, H–M.** ♀ (ZJUH No. 20000173). **G.** ♀ (ZJUH No. 20003756). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Apical antenna, lateral view. **F.** Mandible, ventral view. **G.** Fore wing. **H.** Hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Hind leg. **M.** Lamella, posterior view. Scale bars: 0.1 mm.

Diagnosis

Metasoma narrowing to apex and position of maximum width at basal half (Fig. 6K); apex of metasomal carapace truncate in dorsal view (Fig. 6K); antenna of female hardly widened medially (Fig. 6D), with 12–14 subapical segments moniliform and 24th–27th segments suddenly wider than long while other segments longer than wide (Fig. 6E); temple smooth and shiny (Fig. 6C); mesopleuron punctate and with distinctly smooth and shiny area posteriorly (Fig. 6J); metasoma in lateral view flat (Fig. 5); second submarginal cell sessile and distinctly narrowed anteriorly (Fig. 6G); temple in dorsal view narrowed behind eye (Fig. 6A); mandible slender and inner tooth of mandible 0.4 × as long as apical tooth (Fig. 6F).

Material examined (4 ♀♀, 1 ♂)

CHINA – **Fujian** • 1 ♀; Fuzhou; 28 Oct. 1981; Jiandong Wang leg.; ZJUH No. 20003756. – **Zhejiang** • 1 ♀; back entrance of West Tianmu Mt.; 3 Jul. 1998; Mingshui Zhao leg.; ZJUH No. 20000173. – **Guizhou** • 1 ♀; Leigong Mt.; 1 Jun. 2005; Hongying Zhang leg.; ZJUH No. 20059250. – **Taiwan** • 1 ♀; Jiayi, Zhuqi, Shuisheliao; 16 Nov. 2010; X.X. Chen leg.; ZJUH No. 202307659. – **Guangdong** • 1 ♂; Longmen, Nankun Mt.; 12 May 2004; Z.F. Xu leg.; ZJUH No. 200048044.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Guizhou, Taiwan, Zhejiang).

Remarks

The holotype from Fujian (Wuyi Mt.) was not available for study. The interpretation here is based on the original description and additional Chinese specimens. These four females agree with the description of *P. apetila* except for the metasomal length-to-width ratio (2.0, 2.2 and 2.4 vs 2.0 for the types). This male agrees with the description of *P. apetila*.

Phanerotomella atratoides sp. nov.

[urn:lsid:zoobank.org:act:DA75B610-E76B-472B-B3A4-6A9B74FBE03C](https://doi.org/10.21203/rs.3.rs-1234567/v1)

Figs 7–8

Diagnosis

Mesopleuron distinctly and densely punctate (Fig. 8J); temple rugulose (Fig. 8C); temple in lateral view angularly widened (Fig. 8C); antenna of female distinctly widened medially and subapical segments somewhat serrate (Fig. 8D–E); scapus and pedicellus yellow (Fig. 8D); flagellum basal half pale brown and apical half dark brown (Fig. 8D); body black except face and clypeus reddish (Figs 7, 8B); hind femur and tibia brown except yellowish base (Fig. 8L).

Etymology

Named after the similarity to the Afrotropical *P. atrata* De Saeger, 1948.

Type material

Holotype

CHINA – **Shaanxi** • ♀; Ningshaan, Xunyangba; 33°54.000' N, 108°55.000' E; elev. 1481 m; 1 Jul.–17 Aug. 2016; yellow pan traps and green Malaise trap; J.L. Tan leg.; NWUX.

Paratypes (3 ♀♀)

CHINA – **Shaanxi** • 1 ♀; Xunyangba, Xiezigou; 33°19.200' N, 108°19.800' E; elev. 1425 m; 25 Jul.–22 Oct. 2017; Malaise trap; J.L. Tan and Q.Q. Tan leg.; NWUX. – **Henan** • 1 ♀; Neixiang, Baotianman; 14 Jul. 1998; X.X. Chen leg.; ZJUH No. 988486. – **Zhejiang** • 1 ♀; Xianrending, W of Tianmu Mt.; 4 Jul. 1998; M.S. Zhao leg.; ZJUH No. 992250.

Description

Female

MEASUREMENTS. Length of body 2.8 mm, fore wing 2.7 mm.

COLOURATION. Black; metasoma ventrally white or ivory; antenna brown (flagellum basal half pale brown and apical half brown) except scapus and pedicellus yellow; clypeus reddish brown; mandible yellowish and with reddish teeth; fore and middle legs ivory; hind coxa and trochanter ivory, hind femur and tibia brown except pale yellow base, hind tarsus brown; pterostigma, parastigma and wing veins brown.



Fig. 7. *Phanerotomella atratoides* sp. nov., holotype, ♀ (NWUX), habitus, lateral view. Scale bar: 1.0 mm.

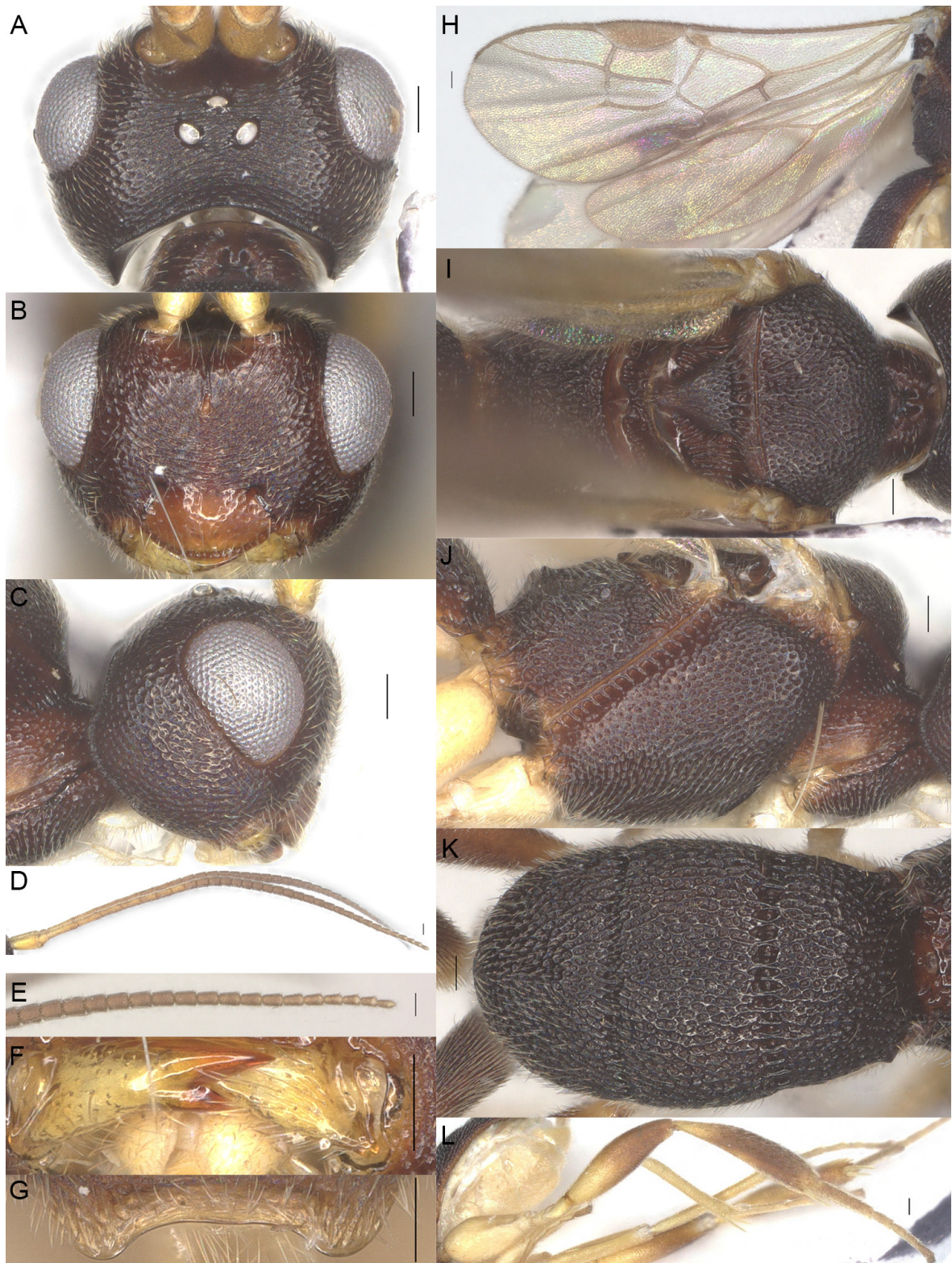


Fig. 8. *Phanerotomella atratoides* sp. nov. **A–F, H–J, L.** Holotype, ♀ (NWUX). **G.** Paratype, ♀ (ZJUH No. 992250). **K.** Paratype, ♀ (ZJUH No. 201805991). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Apical antenna, lateral view. **F.** Mandible, ventral view. **G.** Lamella, posterior view. **H.** Fore and hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Hind leg. Scale bars: 0.1 mm.

HEAD (Fig. 8A–C). Width $1.4\times$ median length in anterior view (Fig. 8B) and part of head above eye in lateral view $0.3\times$ height of eye (Fig. 8C); antenna with 34 segments and $1.5\times$ as long as fore wing, slightly widened and shortened medially, gradually narrowing apically, subapical segments non-moniliform and slightly longer than wide, third, fourth, tenth, fifteenth and penultimate segments 4.0 , 3.2 , 1.4 , 1.1 and $2.0\times$ as long as wide in lateral view, respectively (Fig. 8D–E); area of stemmaticum transversely striate; OOL:OD:POL=26:8:11; length of eye $1.1\times$ temple in dorsal view (Fig. 8A); frons transversely rugulose and with median carina; vertex rugulose-reticulate with short setae; temple rugulose and angularly widened in lateral view (Fig. 8C); face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus smooth and with satin sheen, round medio-ventrally; eye width in lateral view $0.9\times$ maximum width of temple (Fig. 8C), eye height in anterior view $0.6\times$ minimum width of face (Fig. 8B); malar space rugulose and $1.4\times$ as long as basal width of mandible; mandible somewhat slender, lower tooth of mandible $0.5\times$ as long as apical tooth (Fig. 8F); face width $1.1\times$ height of face and clypeus together.

MESOSOMA (Fig. 8I–J). Length $1.5\times$ its width in lateral view (Fig. 8J); side of pronotum superficially and finely punctate; mesoscutum rugulose medio-posteriorly and remainder regularly and densely reticulate; notauli absent; scutellar sulcus with eight short crenulae (Fig. 8I); scutellum reticulate-rugulose; mesopleuron distinctly punctate and without smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt lateral tubercles.

WINGS (Fig. 8H). Fore wing $2.8\times$ as long as its maximum width; second submarginal cell weakly petiolate; vein m-cu distinctly postfurcal; vein r and vein 1-SR+M straight; vein SR1 curved; length of 1-R1 $1.0\times$ pterostigma; vein r issued far beyond middle of pterostigma, $0.9\times$ vein r-m; r:2-SR:SR1=12:35:55; vein 1-CU1 $0.2\times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=25:33:17.

LEGS (Fig. 8L). Hind femur $3.6\times$ as long as wide; longest spur of hind tibia $0.5\times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

METASOMA (Fig. 8G–K). Oval in dorsal view (Fig. 8K), carapace $1.7\times$ as long as wide and $1.1\times$ as long as mesosoma; first to third tergites coarsely rugose-reticulate; third tergite $0.9\times$ as long as second tergite, medial length of third tergite $0.5\times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of medium-sized and blunt tubercles latero-apically (Fig. 8G).

VARIATION. Length of fore wing of female 2.6–2.8 mm.

Male

Unknown.

Host

Unknown.

Distribution

China (Henan, Shaanxi, Zhejiang).

Remarks

Phanerotomella atratoides sp. nov. is similar to *P. atrata* because of the angularly widened temple and the lateral border of the carapace in lateral view being convex. However, *Phanerotomella atratoides* can be distinguished from *P. atrata* by having a superficially punctate clypeus (distinctly punctate in the latter), POL $1.5\times$ as long as OD (1.0 – $1.1\times$ in the latter), OOL $3.4\times$ as long as OD ($3.9\times$ in the latter),

a reticulate-rugulose and matt scutellum (punctate and shiny in the latter), and the basal half of the flagellum yellowish brown and the apical half dark brown (flagellum black in the latter).

Phanerotomella aurantisoma sp. nov.

[urn:lsid:zoobank.org:act:30DC84E0-0358-4AA5-8128-A988A19A372B](https://doi.org/10.3897/zoobank.org/act:30DC84E0-0358-4AA5-8128-A988A19A372B)

Figs 9–10

Diagnosis

Propodeum with pair of small tubercles latero-posteriorly (Fig. 10I); vein 1-SR+M slightly concave (Fig. 10G); vein r $1.3\times$ as long as vein r-m (Fig. 10G); mandible slender and inner tooth of mandible reduced, $0.4\times$ apical tooth (Fig. 10D); length of fore wing 4.6 mm (Fig. 10G); scutellum largely punctate except basal reticulation and shiny (Fig. 10H); temple punctate and shiny (Fig. 10C); hind tarsus dark brown (Fig. 10F).

Etymology

Named after the orange mesosoma; ‘*aurantium*’ is Latin for ‘orange’ and ‘*soma*’ is Greek for ‘body’.

Type material

Holotype

CHINA – Guangdong • ♀; Huizhou, Xiangtou Mt.; 11 Mar. 2004; Z.F. Xu leg.; ZJUH No. 20048095.

Paratypes (2 ♀♀)

CHINA – Guangxi • 1 ♀; Daming Mt., Chaoyanggou; 10 Aug. 2011; H. Dong leg.; ZJUH No. 201100511.
– Fujian • 1 ♀; Jiangle, Longqi Mt.; 1 Jul. 1991; C.M. Liu leg.; ZJUH No. 969636.

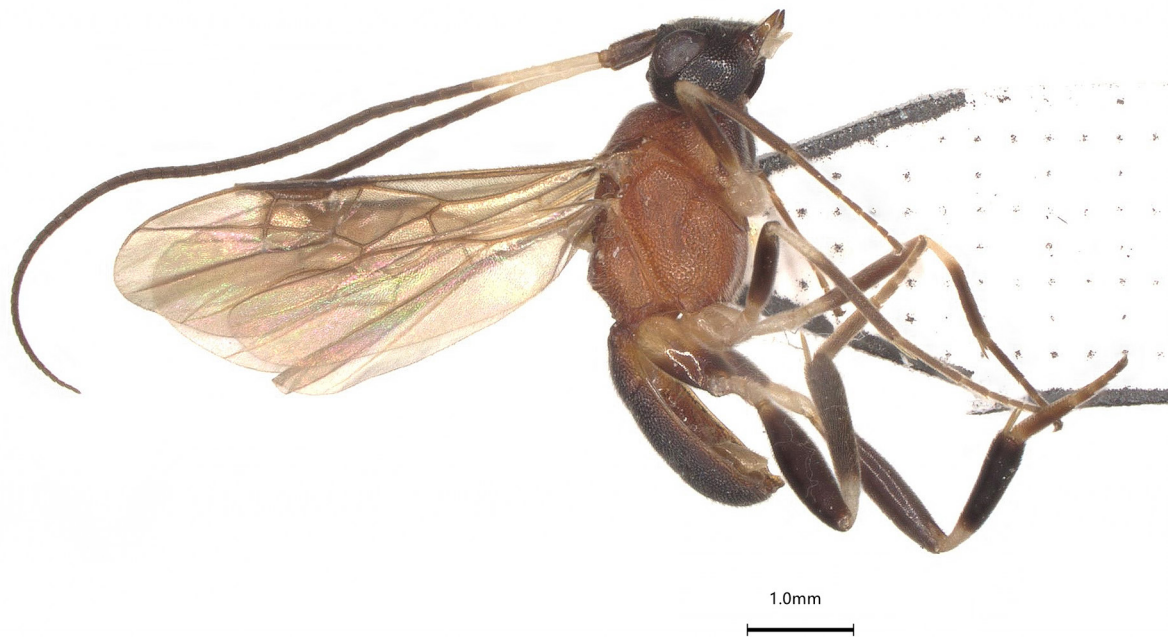


Fig. 9. *Phanerotomella aurantisoma* sp. nov., holotype, ♀ (ZJUH No. 20048095), habitus, lateral view. Scale bar: 1.0 mm.

Description

Female

MEASUREMENTS. Length of body 5.1 mm, fore wing 4.6 mm.

COLOURATION. Head and metasoma black, mesosoma orange brown; metasoma ventrally white or ivory; antenna black except 3rd–5th segments white; mandible basal half dark brown and apical half yellowish and with reddish teeth; fore and middle legs black except coxa, trochanter, basally femur and tibia white; hind leg black except base of coxa, trochanter, base of femur and of tibia white; pterostigma brown, parastigma and wing veins pale brown.

HEAD (Fig. 10A–C). Width $1.3 \times$ median length in anterior view (Fig. 10B) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 10C); antenna with 52 segments and $1.7 \times$ as long as fore wing, not widened but shortened medially, gradually narrowing apically, subapical segments non-moniliform and longer than wide, third, fourth, tenth, fifteenth and penultimate segments 4.0, 3.8, 1.6, 1.3 and $1.8 \times$ as long as wide in lateral view, respectively (Fig. 10K–L); area of stemmaticum transversely striate; OOL:OD:POL=36:13:11; length of eye $1.0 \times$ temple in dorsal view (Fig. 10A); frons transversely rugulose and with median carina; vertex rugulose-reticulate with short setae; temple densely punctate and shiny; face densely punctate-rugulose and with distinct median ridge, dorsally connected to median carina; clypeus finely and superficially punctate and with shiny interspaces, truncate medio-ventrally; eye width in lateral view $0.8 \times$ maximum width of temple (Fig. 10C), eye height in anterior view $0.7 \times$ minimum width of face (Fig. 10B); malar space rugulose and $1.1 \times$ as long as basal width of mandible; mandible rather slender, lower tooth of mandible $0.4 \times$ as long as apical tooth (Fig. 10D); face width $0.9 \times$ height of face and clypeus together.

MESOSOMA (Fig. 10H–I). Length $1.5 \times$ its width in lateral view (Fig. 10I); side of pronotum rugulose except for finely punctation; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with five short crenulae (Fig. 10H); scutellum largely finely punctate except basally reticulate; mesopleuron densely and regularly reticulate without smooth and shiny area posteriorly, with weak and incomplete precoxal sulcus basally; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt lateral tubercles.

WINGS (Fig. 10G). Fore wing $3.2 \times$ as long as its maximum width; second submarginal cell sessile; vein m-cu distinctly postfurcal; veins r and SR1 straight; vein 1-SR+M slightly concave; length of 1-R1 $1.2 \times$ pterostigma; vein r issued far beyond middle of pterostigma, $1.5 \times$ vein r-m; r:2-SR:SR1=17:42:79; vein 1-CU1 $0.3 \times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=30:50:17.

LEGS (Fig. 10F). Hind femur $4.4 \times$ as long as wide; longest spur of hind tibia $0.4 \times$ its basitarsus; hind leg smooth and shiny except fine and superficial punctation; hind tibia slender; middle tibia without ivory blister.

METASOMA (Fig. 10E, J). Oval in dorsal view (Fig. 10J), carapace $1.7 \times$ as long as wide and as long as mesosoma; first to third tergites densely reticulate-rugose; third tergite $1.0 \times$ as long as second tergite, medial length of third tergite $0.5 \times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of medium-sized and blunt tubercles latero-apically (Fig. 10E).

VARIATION. Length of fore wing of female 4.0–4.6 mm.

Male

Unknown.

Host

Unknown.

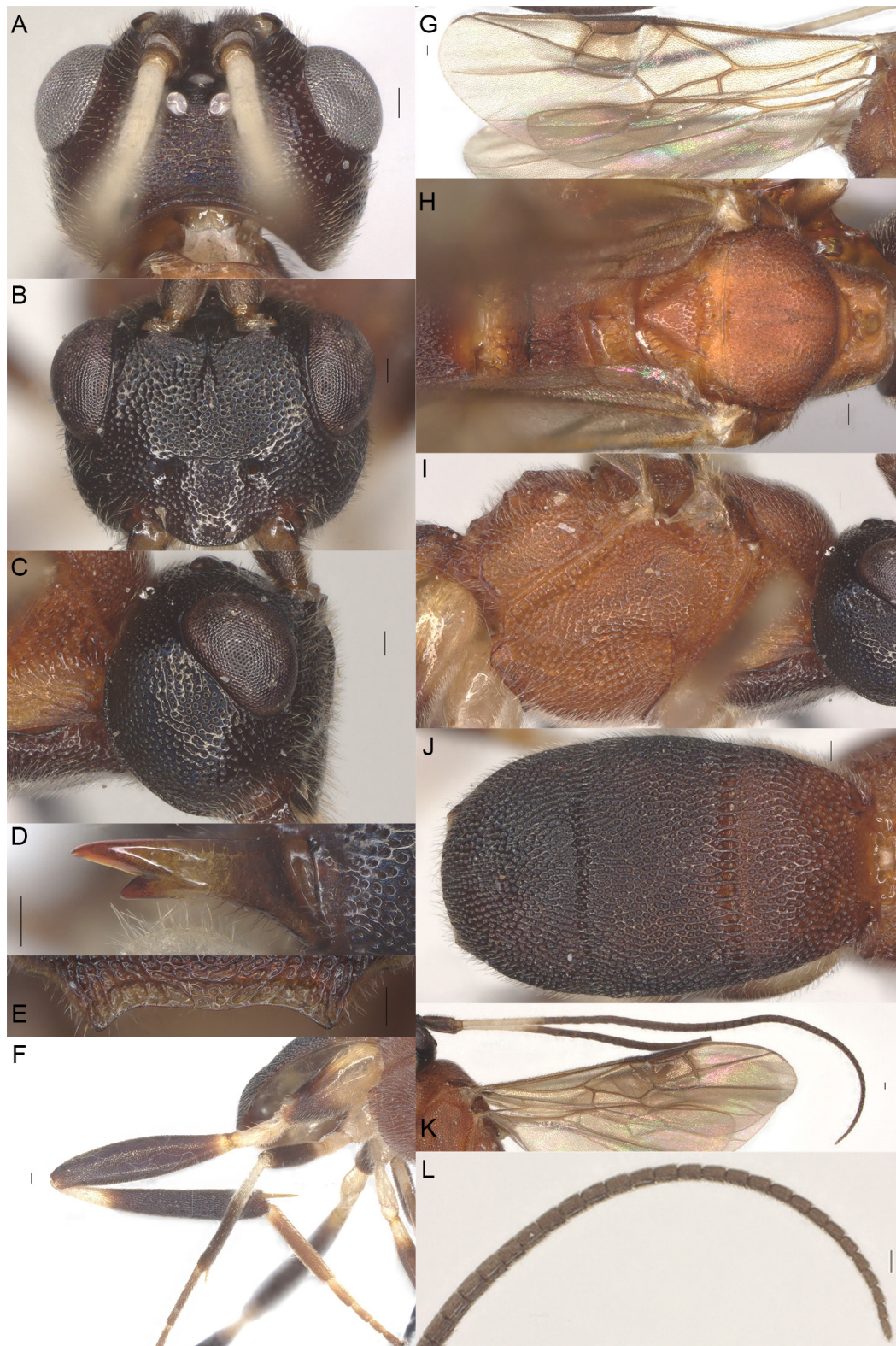


Fig. 10. *Phanerotomella aurantisoma* sp. nov. **A, H.** Paratype, ♀ (ZJUH No. 201100511). **B–G, I–L.** Holotype, ♀ (ZJUH No. 20048095). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

Distribution

China (Fujian, Guangdong, Guangxi).

Remarks

Phanerotomella aurantisoma sp. nov. is similar to *P. digitata* sp. nov. because of its having the antenna with a white band on 3rd–5th segments, mesosoma orange-brown and eye in dorsal view as long as temple. However, *Phanerotomella aurantisoma* can be distinguished from *P. digitata* by having the propodeum with a pair of small and blunt tubercles latero-posteriorly (distinctly larger and finger-shaped tubercles in the latter), a punctate and shiny scutellum (reticulate and matt in the latter), a punctate and shiny temple and face (rugulose and matt in the latter), a comparatively slender mandible and the inner tooth $0.4 \times$ as long as apical tooth (more robust and $0.5 \times$ in the latter).

Phanerotomella barbieri Sigwalt, 1978

Figs 11–12

Phanerotomella barbieri Sigwalt, 1978: 716–719.

Phanerotomella barbieri – Zettel 1989: 26, 53–54. — Long & Belokobylskij 2004: 387.

Diagnosis

Second submarginal cell strongly petiolate, at least $0.5 \times$ as long as vein r (Fig. 12G); hind femur robust, $3.0 \times$ as long as wide (Fig. 12F); OOL $3.1 \times$ as long as OD (Fig. 12A); lamella of third metasomal tergite distinctly protruding medio-apically (Fig. 12K); mesopleuron regularly reticulate and with smooth and



Fig. 11. *Phanerotomella barbieri* Sigwalt, 1978, China, ♀ (ZJUH No. 202307706), habitus, lateral view. Scale bar: 1.0 mm.

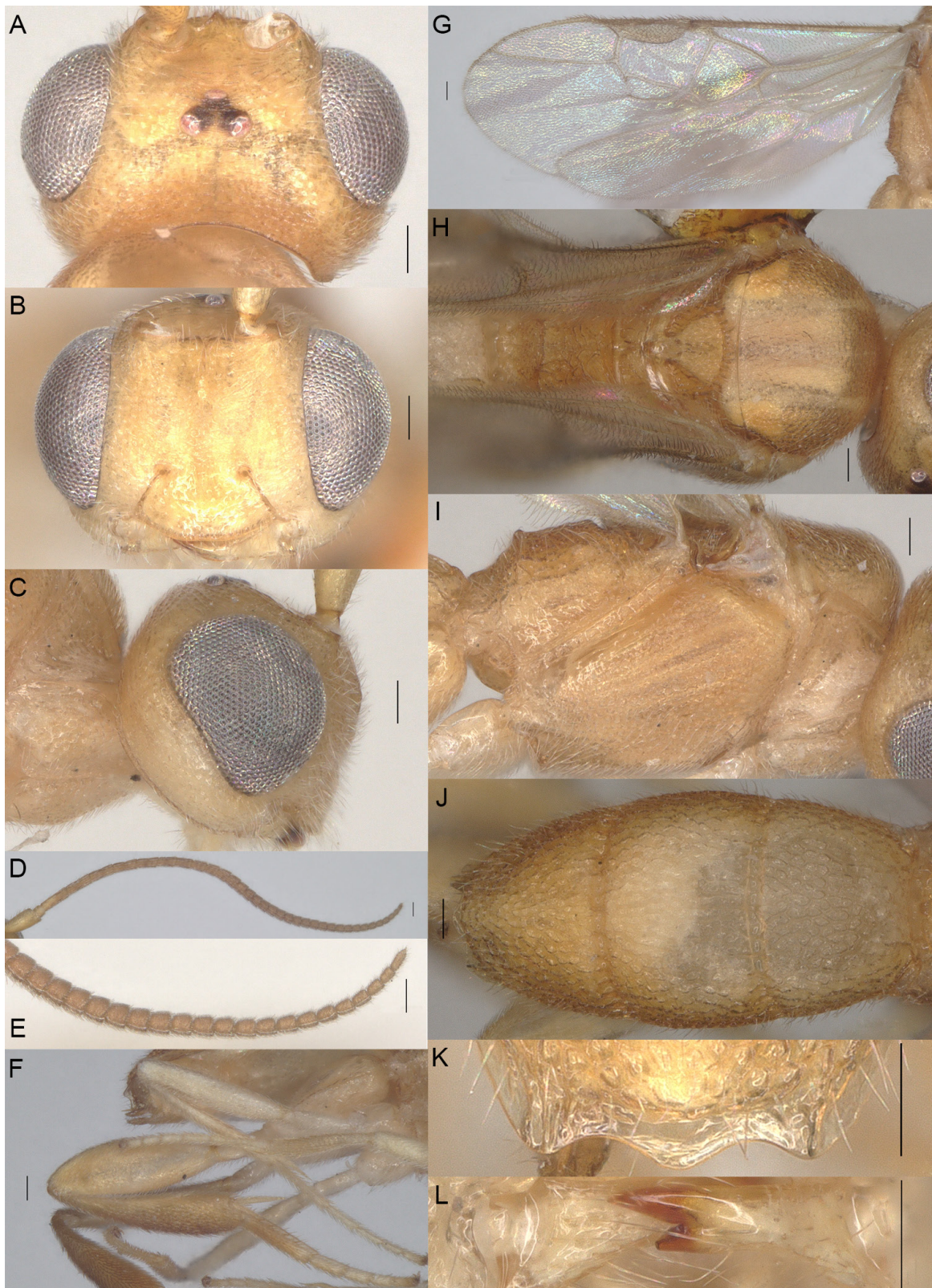


Fig. 12. *Phanerotomella barbieri* Sigwalt, 1978, China, ♀ (ZJUH No. 202307706). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Apical antenna, lateral view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Lamella, posterior view. **L.** Mandible, ventral view. Scale bars: 0.1 mm.

shiny area posteriorly (Fig. 12I); antenna of female widened medially and 15th–23rd segments as long as wide (Fig. 12D), its subapical segments moniliform (Fig. 12E).

Material examined (7 ♀♀, 2 ♂♂)

CHINA – **Taiwan** • 1 ♀; Baxian Mt.; 4 Jun. 2011; P. Tang leg.; ZJUH No. 202307706. – **Zhejiang** • 3 ♀♀; back entrance of West Tianmu Mt.; 14 Jul. 1998; M.S. Zhao leg.; light trap; ZJUH Nos 20000195 to 20000197 • 1 ♀; back entrance of West Tianmu Mt.; 4 Aug. 1998; M.S. Zhao leg.; light trap; ZJUH No. 20000277 • 1 ♀; Kaihua, Gutian Mt.; 30 Jul. 1992; H. Wu leg.; ZJUH No. 934721 • 1 ♂; Anji, Longwang Mt.; 21 Aug. 1995; H. Wu leg.; ZJUH No. 971665. – **Hainan** • 1 ♀; Ledong, Jianfengling; 7 May 2008; J.X. Liu leg.; ZJUH No. 200800100 • 1 ♂; Jianfengling; 7 Jun. 2007; J.X. Liu leg.; ZJUH No. 200702417.

Host

Unknown.

Distribution

China (Taiwan, Zhejiang, Hainan), Vietnam.

Remarks

The holotype from Vietnam (Saigon) was examined by Zettel (1989) and our interpretation is based on the description by Zettel (1989), additional Chinese specimens listed above and the original description. The seven females examined agree with the description of *P. barbieri* except for body length (2.2–3.1 mm vs 2.1–2.4 mm for the types) and the antennal segment number (35 and 32 vs 31 for the types). The two males examined agree with the description of *P. barbieri*.

Phanerotomella bellula Papp, 1989

Figs 13–14

Phanerotomella bellula Papp, 1989: 301.

Phanerotomella rugifrontata Chen & Ji, 2003: 180, 200–201, 230, 255–256. **Syn. nov.**

Phanerotomella bellula – Tobias 2000: 439–440. — Ku *et al.* 2001: 83.

Diagnosis

Eye in lateral view at most 1.0× as wide as maximum width of temple (Fig. 14C) and eye in dorsal view less protruding (Fig. 14A); mesosoma largely black except metanotum and propodeum posteriorly yellowish (Fig. 14I) and less contrasting with black head; metasomal carapace black except basally yellow (Fig. 14K); hind coxa yellow except laterally somewhat dark brown (Fig. 14F).

Material examined (38 ♀♀, 37 ♂♂)

CHINA – **Hunan** • 2 ♀♀; Liuyang; 20 May 1985; X.W. Tong leg.; ZJUH Nos 20044648, 20044649 • 1 ♂; Liuyang; 20 Jun. 1985; X.W. Tong leg.; ZJUH No. 20044708 • 2 ♀♀; same data as for preceding; ZJUH Nos 20044707, 20044709 • 1 ♀; Liuyang; 25 Jun. 1985; X.W. Tong leg.; ZJUH No. 20044711 • 1 ♂; Liuyang; 30 May 1984; ZJUH No. 846385 • 1 ♂; Liuyang; 17 May 1985; X.W. Tong leg.; ZJUH No. 864630 • 2 ♂♂; Liuyang; 21 May 1985; X.W. Tong leg.; ZJUH Nos 20044652, 20044653 • 9 ♂♂; Liuyang; 25 May 1985; X.W. Tong leg.; ZJUH Nos 864628(a, b, c), 864631(a, b, c, d, e, f) • 7 ♂♂; Liuyang; 31 May 1985; X.W. Tong leg.; ZJUH Nos 20044688, 20044689, 20044690, 20044691, 20044692, 20044693, 20044694. – **Zhejiang** • 1 ♀; Hangzhou; 12 Jun. 1987; Y. Ma leg.; ZJUH No. 870950 • 1 ♂;

Hangzhou; 12 Jun. 1987; Z.H. Xu leg.; ZJUH No. 870981 • 1 ♀; Hangzhou; 28 Jun. 1991; X.X. Chen leg.; ZJUH No. 911319 • 1 ♂; West Tianmu Mt.; 31 May 1998; X.X. Chen leg.; ZJUH No. 980136 • 1 ♀; Songyang; 13 Jul. 1989; J.H. He leg.; ZJUH No. 893714 • 1 ♂; Songyang; 15–17 Jul. 1989; J.H. He leg.; ZJUH No. 894465 • 3 ♀♀; same data as for preceding; ZJUH Nos 893840, 894207, 894221 • 1 ♂; Kaihua; Gutian Mt.; 1–3 Jul. 2005; X.X. Chen leg.; ZJUH No. 200604209 • 7 ♀♀; same data as for preceding; ZJUH Nos 200604116, 200604196 to 200604198, 200604213, 200604216, 200604239 • 2 ♀♀; Kaihua, Gutian Mt.; 2 Jul. 2005; X.X. Chen leg.; ZJUH Nos 200601527, 200601581 • 2 ♀♀; Kaihua, Gutian Mt.; 2 Jul. 2005; Q. Wu leg.; ZJUH Nos 200601975, 200604017 • 1 ♂; Kaihua, Gutian Mt.; 2 Jul. 2005; H.Y. Zhang leg.; ZJUH No. 200602153 • 2 ♀♀; same data as for preceding; ZJUH Nos 200602152, 200602154 • 3 ♂♂; Kaihua, Gutian Mt.; 2 Jul. 2005; M. Shi leg.; ZJUH Nos 200601755, 200601756, 200601758 • 2 ♀♀; same data as for preceding; ZJUH Nos 200601753, 200601759 • 1 ♀; Kaihua, Gutian Mt.; 3 Jul. 2005; X.X. Chen leg.; ZJUH No. 200601606 • 1 ♂; Kaihua, Gutian Mt.; 3 Jul. 2005; Q. Wu leg.; ZJUH No. 200602083 • 4 ♀♀; same data as for preceding; ZJUH Nos 200602076, 200602079, 200602086, 200602098 • 1 ♀; Kaihua, Gutian Mt.; 3 Jul. 2005; H.Y. Zhang leg.; ZJUH No. 200602270. – **Fujian** • 1 ♀; Shanghang, Guihe; 20–24 Jul. 1988; J. Huang leg.; ZJUH No. 20004882 • 1 ♀; Shanghang, Guihe; 22 Jul. 1988; J. Huang leg.; ZJUH No. 20004957 • 2 ♀♀; Meihua Mt.; elev. 1000–1400 m; 23–24 Jul. 1988; J.H. He leg.; ZJUH Nos 887410, 887414 • 1 ♀; Jiangle; Longqi Mt.; 7 Sep. 1989; C.M. Liu leg.; ZJUH No. 20006695 • 1 ♂; Gang Mt.; 1 Aug. 1985; M.L. Sheng leg.; ZJUH No. 20003774. – **Guangdong** • 1 ♀; Ruyuan, Nanling; 18 Apr. 2004; Z.F. Xu leg.; ZJUH No. 20047724 • 4 ♂♂; Fengkai, Qiancengfeng; 3 Oct. 2003; Z.F. Xu leg.; ZJUH Nos 20048070, 20048072,



Fig. 13. *Phanerotomella bellula* Papp, 1989, China, ♀ (ZJUH No. 200604213), habitus, lateral view. Scale bar: 1.0 mm.

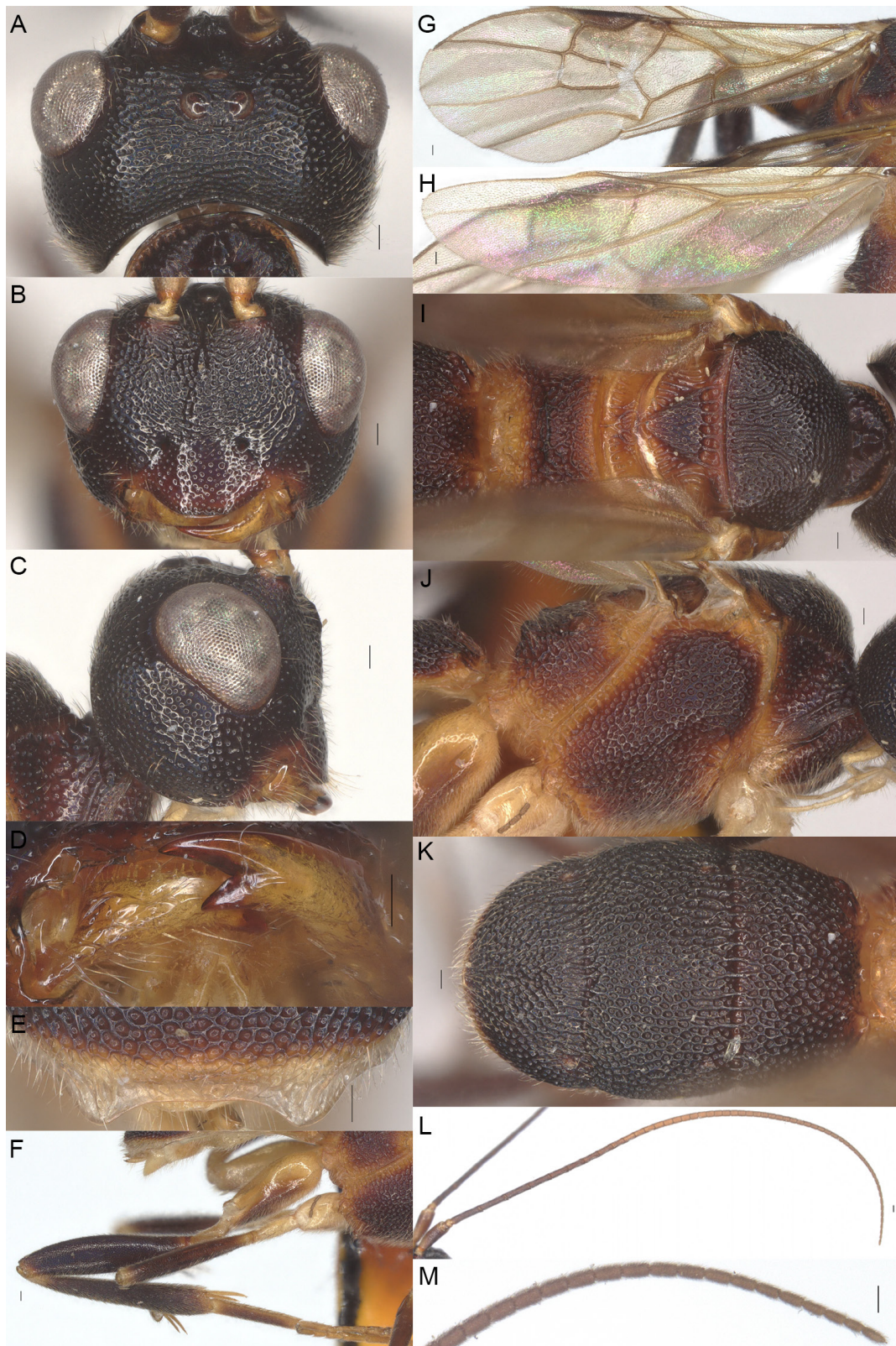


Fig. 14. *Phanerotomella bellula* Papp, 1989, China, ♀ (ZJUH No. 200604213). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore wing. **H.** Hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Antenna, lateral view. **M.** Apical antenna, lateral view. Scale bars: 0.1 mm.

20048076, 20048082. – **Jiangsu** • 1 ♂; Nanjing; 14 Jun. 1993; M.L. Sheng leg.; ZJUH No. 948261. – **Guizhou** • 1 ♂; Fangxiangxiang, Leigong Mt.; 2–3 Jun. 2005; J.X. Liu leg.; ZJUH No. 20059353.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Guizhou, Hunan, Jiangsu, Zhejiang), North Korea.

Remarks

The holotype of *P. bellula* from North Korea (Gang-von) was examined by using the original description, a photo of the holotype and additional Chinese specimens examined. There are thirty-eight females agreeing with the description of *P. bellula* except for the propodeum colouration (some females totally orange-brown vs only posteriorly orange-brown for the types).

The holotype of *P. rugifrontata* from China was not available and the interpretation is based on the original description.

Phanerotomella rugifrontata is treated as a junior synonym of *P. bellula* Papp, 1989 based on the following key characters: (1) vein m-cu postfurcal; (2) second submarginal cell sessile (the latter's vein 2-SR weakly developed); (3) antenna rather slender, with 57 segments and all antennal segments longer than wide; (4) length of eye in dorsal view equal to that of temple; (5) frons transversely rugulose, temple densely punctate, mesopleuron punctate (the latter's punctate-reticulate) and mesoscutum honeycomb sculptured except medio-posteriorly rugose; (6) metasomal carapace elliptical, 1.6 × as long as maximum width; (7) vein 1-R1 longer than pterostigma.

Phanerotomella bicolorata He & Chen, 1995

Figs 15–16

Phanerotomella bicolorata He & Chen in Chen, He & Ma, 1995: 561–562.

Phanerotomella gracilimandiblis Chen & Ji, 2003: 185–187, 230, 252–253. **Syn. nov.**

Phanerotomella bicolorata – He *et al.* 2001: 47; 2004: 640, 642. — Chen & Ji 2003: 180, 183, 230.

Diagnosis

Basal carina of first metasomal tergite distinctly developed (Fig. 16J); first metasomal tergite distinctly longitudinally striate (Fig. 16J); apex of metasomal carapace less flat (Fig. 16J); temple distinctly finely punctate and shiny (Fig. 16C); mesopleuron coarsely rugose (Fig. 16I).

Type material

Holotype

CHINA • ♀; Zhejiang, Gutian Mt.; 20 Jul. 1992; Y. Ma leg.; ZJUH No. 923190.

Paratypes

CHINA – **Zhejiang** • 2 ♀♀; Gutian Mt.; 20 Jul. 1992; Y. Ma leg.; ZJUH Nos 923192, 923193 • 1 ♀; Qingyuan, Baishanzu; 18 Jul. 1994; H. Wu leg.; ZJUH No. 946808 • 1 ♀; Qingyuan, Baishanzu; 19 Jul. 1994; H. Wu leg.; ZJUH No. 946868. – **Fujian** • 2 ♀♀; Wuyi Mt.; 22 Jul. 1986; J.S. Wang leg.; ZJUH Nos 865331, 865333 • 1 ♀; Tongmu; 11 Jul. 1982; J.C. Huang leg.; ZJUH No. 880758 • 1 ♀; Xianfengling; 6 Jun. 1980; J.C. Huang leg.; ZJUH No. 880755 • 1 ♀; Wuyi Mt., Tongmu; 14 Jul. 1994;

X.X. Chen leg.; ZJUH No. 942519 • 1 ♀; Wuyi Mt., Tongmu; 16 Jul. 1994; Z.F. Xu leg.; ZJUH No. 942938 • 1 ♀; Wuyi Mt., Huanggang; 16 Jul. 1994; X.X. Chen leg.; ZJUH No. 948715.

Other material examined (12 ♀♀)

CHINA – **Fujian** • 1 ♀; Wuyi Mt., Xianfengling; 20 Jul. 1989; J.S. Wang leg.; ZJUH No. 20005772 • 1 ♀; Wuyi Mt., Xianfengling; 30 Aug. 1989; J.S. Wang leg.; ZJUH No. 20008724 • 1 ♀; Wuyi Mt., Xianfengling; 27 Oct. 1989; J.S. Wang leg.; ZJUH No. 20008610 • 1 ♀; Guadang; 2 Jul. 1985; D.H. Huang leg.; ZJUH No. 881316 • 1 ♀; Jiangle, Longqi Mt.; 1 Jul. 1991; C.M. Liu leg.; ZJUH No. 969651. – **Zhejiang** • 1 ♀; Gutian Mt.; 20 Jul. 1992; Y. Ma leg.; ZJUH No. 923190 • 1 ♀; Linan, Qinliangfeng; 9 Aug. 2005; H.Y. Zhang leg.; ZJUH No. 200603305 • 1 ♀; Tianmu Mt.; 29 Jul. 2011; S.N. Song leg.; ZJUH No. 201101725. – **Guangdong** • 1 ♀; Nanling; 9 Jul. 2005; B. Xiao leg.; ZJUH No. 200611281 • 1 ♀; Shaoguan, Nanling; 9–18 Jul. 2005; Y.L. Cai leg.; ZJUH No. 200609626 • 1 ♀; Ruyuan, Nanling; 24 Aug. 2010; H.F. Chai leg.; ZJUH No. 201100515 • 1 ♀; Zhaoqing, Dinghu Mt.; 11–12 Aug. 2005; Z.F. Xu leg.; ZJUH No. 200610117.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Yunnan, Zhejiang).

Remarks

The holotype of *P. bicolorata* was examined. There are twelve females agreeing with the description of *P. bicolorata* except for body length (3.0–4.0 mm vs 3.5–3.9 mm for the types).

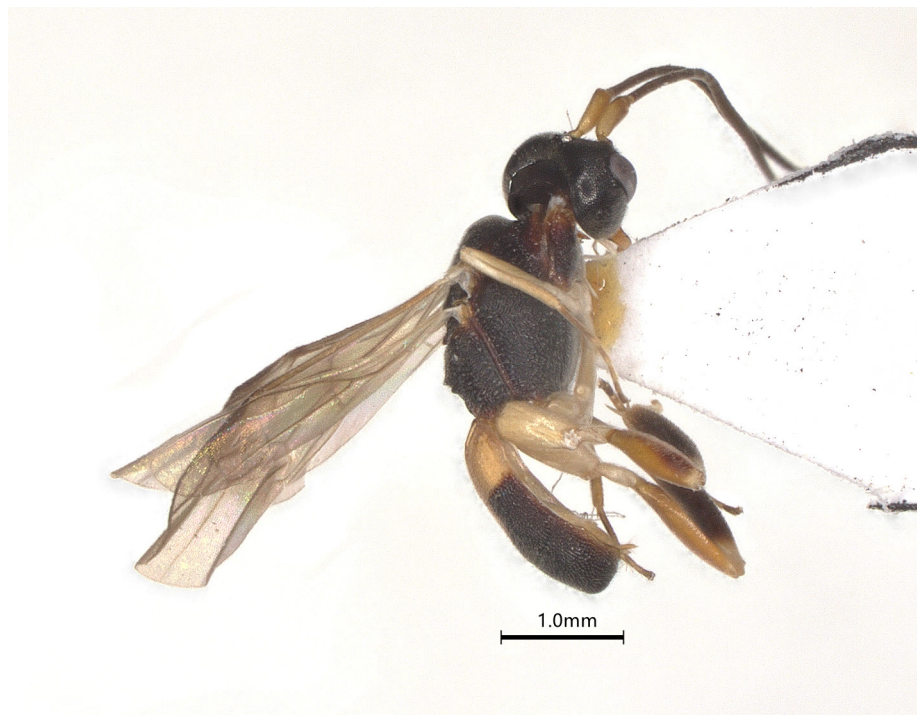


Fig. 15. *Phanerotomella bicolorata* He & Chen, 1995, China, ♀ (ZJUH No. 201101725), habitus, lateral view. Scale bar: 1.0 mm.

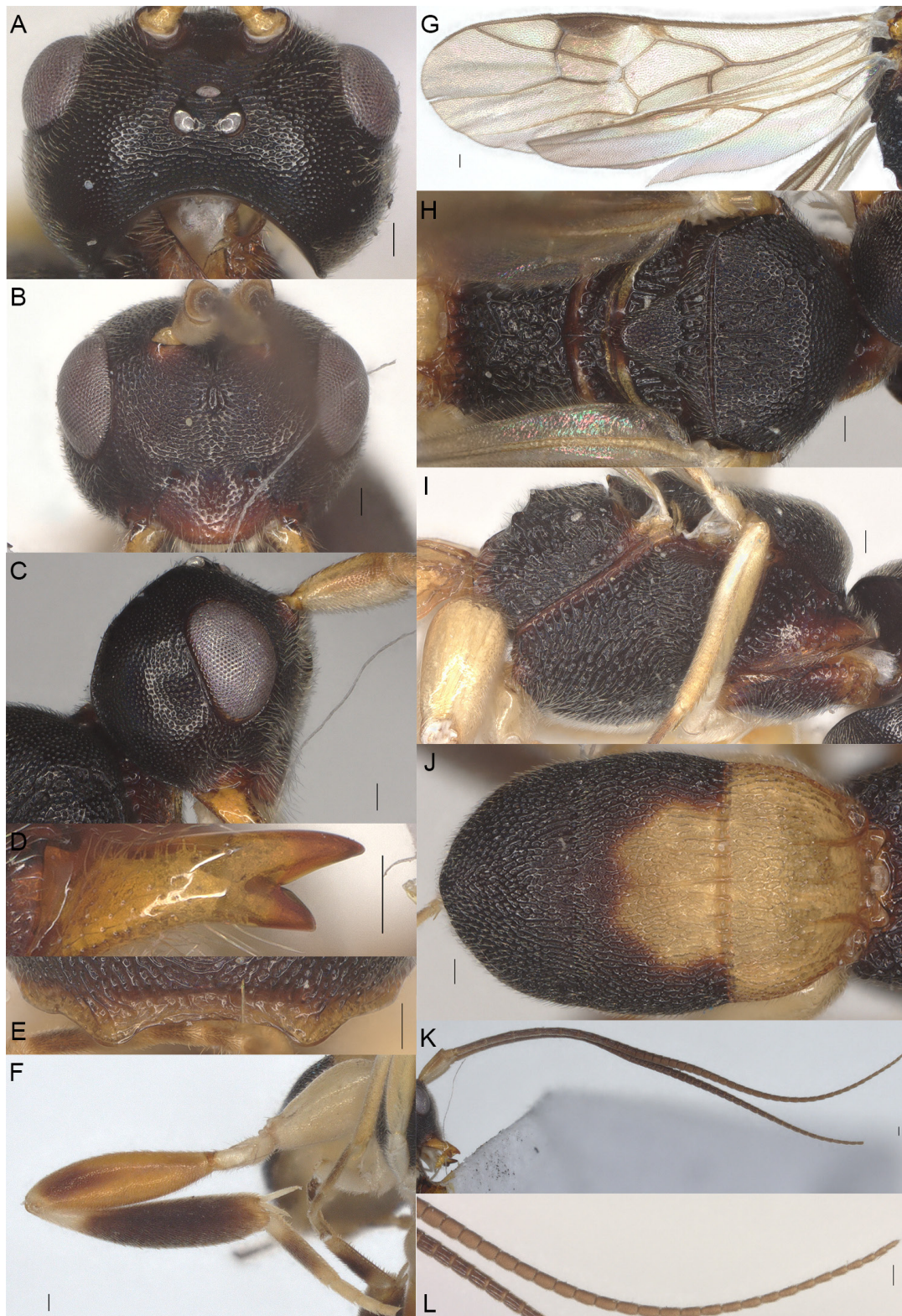


Fig. 16. *Phanerotomella bicolorata* He & Chen, 1995, China, ♀ (ZJUH No. 201101725). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

The holotype of *P. gracilimandiblis* from China was not available for study and our interpretation is based on the original description.

Phanerotomella gracilimandiblis is treated as a junior synonym of *P. bicolorata* based on the following key characters: (1) vein m-cu postfurcal; (2) second submarginal cell sessile; (3) scapus and pedicellus in lateral view yellow and distinctly contrasting with dark brown flagellum; (4) occipital carina in dorsal view strongly indented; (5) apex of metasomal carapace less flat; (6) first metasomal tergite distinctly longitudinally striate; (7) vein 1-R1 shorter than pterostigma; (8) metasomal carapace black except first tergite yellow and second tergite medio-basally with yellow spot.

Phanerotomella bisulcata (Herrich-Schäffer, 1838)

Figs 17–18

Chelonus bisulcatus Herrich-Schäffer, 1838: 154. Type series lost.



Fig. 17. *Phanerotomella bisulcata* (Herrich-Schäffer, 1838), China, ♀ (ZJUH No. 20059349), habitus, lateral view. Scale bar: 1.0 mm.

Phanerotomella nigra Szépligeti, 1900b: 215, 218.

Phanerotomella flavipes Šnoflák, 1951: 31–33.

Ascogaster bisulcatus – Dalla Torre 1898: 193. — Szépligeti 1904: 97.

Phanerotomella nigra – Szépligeti 1904: 101. — Fahringer 1934: 582, 584. — Telenga 1941: 242. — Shenefelt 1973: 930. — Tobias 1986: 299. — Zettel 1987: 369; 1989: 20, 22. — Papp 1987: 323; 1989: 301; 2004: 192. — Čapek & Lukas 1989: 43. — van Achterberg 1990: 8–9.

Phanerotomella bisulcata – Fahringer 1934: 583. — Telenga 1941: 242. — Shenefelt 1973: 929. — Tobias 1986: 299. — Moreno & Jiménez 1988: 392–393. — Zettel 1989: 18, 20–22. — van Achterberg 1990: 8–9. — Moreno *et al.* 1993: 431. — Bergamesco *et al.* 1995: 22. — Papp 1996: 152–153; 1999: 63; 2003a: 33; 2005b: 161; 2005a: 158; 2012: 177 (). — Belokobylskij & Taeger 2001: 107. — Belokobylskij *et al.* 2003: 376.

Phanerotomella flavipes – Šnoflák 1951: 31–33. — Shenefelt 1973: 929–930. — Tobias 1976: 140; 1986: 299. — Moreno & Jiménez 1988: 393. — Zettel 1989: 20, 22. — Čapek & Lukas 1989: 43. — Talitzky & Kuslitzky 1990: 72. — van Achterberg 1990: 8–9.

Diagnosis

Antenna with subapical segments moniliform (Fig. 18L); scapus yellowish brown and contrasting with dark brown apical antennal segments (Fig. 18L); mesopleuron coarsely reticulate (Fig. 18J); metasoma in lateral view flat (Fig. 17); border of metasomal carapace more curved (Fig. 18K).

Material examined (1 ♀, 13 ♂♂)

CZECH REPUBLIC – **Mohelno** • ♀ (holotype of *P. flavipes* Šnoflák, 1951, examined by the second author); steppe; 11 Jul. 1940; Gregor leg.; Brno.

CHINA – **Guizhou** • 4 ♂♂; Fangxiangxiang, Leigong Mt.; 2–3 Jun. 2005; J.X. Liu leg.; ZJUH Nos 20059329, 20059333, 20059335, 20059341 • 1 ♀; same data as for preceding; ZJUH No. 20059349. – **Henan** • 1 ♂; Neixiang, Baotianman; 14 Jul. 1998; X.X. Chen leg.; ZJUH No. 988501 • 1 ♂; Neixiang, Baotianman; 13–15 Jul. 1998; Y. Ma leg.; sweep net; ZJUH No. 987348 • 1 ♂; Luanchuan, Longyuwan; 13 Jul. 1996; P. Cai leg.; ZJUH No. 974782. – **Fujian** • 1 ♂; Wuyi Mt., Tongmu; 2–6 Aug. 1983; Y. Ma leg.; ZJUH No. 832472 • 1 ♂; Chongan, Huanggang Mt.; 10 Aug. 1985; M.H. Liu leg.; ZJUH No. 20004089. – **Hainan** • 1 ♂; Diaoluo Mt.; 16 Jul. 2006; J.X. Liu leg.; ZJUH No. 200611319 • 1 ♂; Yinggeling; 23 May 2007; J.X. Liu leg.; ZJUH No. 200702316. – **Guangdong** • 1 ♂; Nanling; 10–14 May 2006; J.X. Liu leg.; ZJUH No. 200610574. – **Yunnan** • 1 ♂; Ruili, Mengxiu; 2–6 May 1981; J.H. He leg.; ZJUH No. 814055.

Host

Unknown.

Distribution

Austria, China (Guizhou, Henan, Fujian, Hainan, Yunnan, Guangdong), former Czechoslovakia, former Yugoslavia, Germany, Greece, Hungary, Israel, Italy, Korea, Moldova, Russia, Spain.

Remarks

The lectotype of *P. nigra*, from Hungary, was examined by the second author. The type series of *P. bisulcata* is lost. This female agrees with the description of *P. bisulcata* except for body length (3.5 mm vs 2.6–3.2 mm for the types) and the antennae segments number (35 vs 29–30 for the types). There are thirteen males agreeing with the description of *P. bisulcata*.

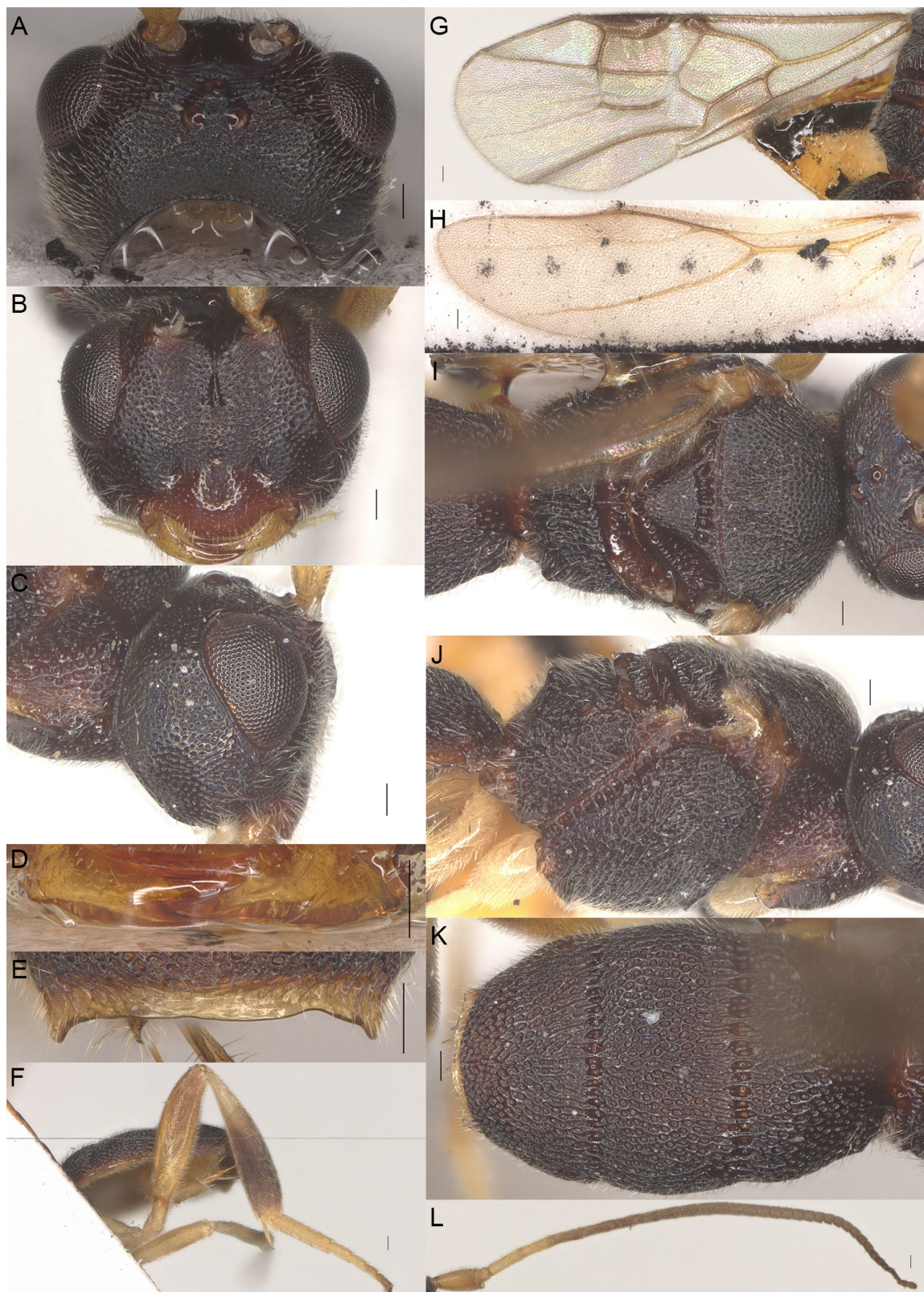


Fig. 18. *Phanerotomella bisulcata* (Herrich-Schäffer, 1838), China, ♀ (ZJUH No. 20059349). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore wing. **H.** Hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Antenna, lateral view. Scale bars: 0.1 mm.

Phanerotomella bouceki Zettel, 1989

Figs 19–20

Phanerotomella bouceki Zettel, 1989: 25, 56–57.

Phanerotomella bouceki – He *et al.* 2001: 47–48, 50. — Chen & Ji 2003: 181, 183–184, 230.

Diagnosis

Antenna of female with 14 subapical segments moniliform (Fig. 20D); metasoma 1.6–1.7 × as long as wide (Fig. 20J); head entirely yellow (Fig. 20A).



Fig. 19. *Phanerotomella bouceki* Zettel, 1989, China, ♀ (ZJUH No. 200711566), habitus, lateral view. Scale bar: 1.0 mm.

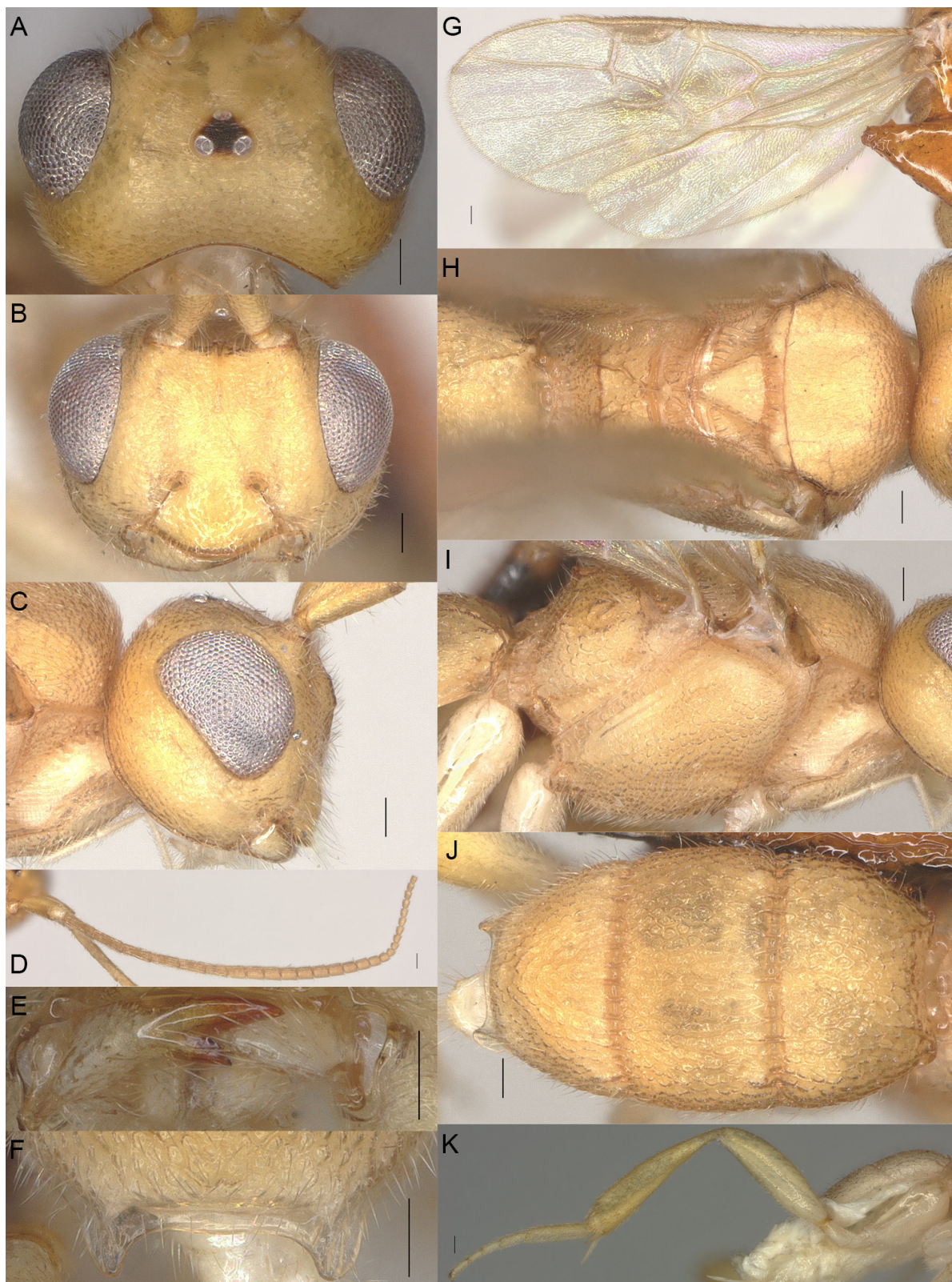


Fig. 20. *Phanerotomella bouceki* Zettel, 1989, China. **A, K.** ♀ (ZJUH No. 201100673). **B–J.** ♀ (ZJUH No. 200711566). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Mandible, ventral view. **F.** Lamella, posterior view. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Hind leg. Scale bars: 0.1 mm.

Material examined (8 ♀♀, 3 ♂♂)

CHINA – **Zhejiang** • 1 ♀; Gutian Mt.; 1 Aug. 1990; Y. Ma leg.; ZJUH No. 906172 • 1 ♀; back of West Tianmu Mt.; 27 Jul. 1999; M.S. Zhao leg.; light trap; ZJUH No. 20000557 • 1 ♀; Taishun, Wuyanling; 2 Aug. 2005; P. Xu leg.; ZJUH No. 200605171 • 1 ♂; Linan, Qingliangfeng; 8 Aug. 2005; H.Y. Zhang leg.; ZJUH No. 200603208. – **Fujian** • 1 ♀; Meihua Mt., Guihe to Baigongao; elev. 1100–1400 m; 23–24 Jul. 1988; J.H. He leg.; ZJUH No. 887411. – **Guangdong** • 1 ♀; Fogang, Guanyin Mt.; 15–16 Sep. 2007; Z.F. Xu leg.; ZJUH No. 200711566 • 2 ♂♂; Fogang, Guanyin Mt.; 15 Sep. 2007; J. Zeng leg.; ZJUH Nos 200705084, 200705085. – **Guangxi** • 1 ♀; Daming Mt.; 5–15 Aug. 2011; Z. Liu leg.; ZJUH No. 201100707 • 1 ♀; Daming Mt., Neichao; 13 Aug. 2011; C.J. Yan leg.; ZJUH No. 20110067. – **Hainan** • 1 ♀; Baisha, Yinggeling; 28 May. 2007; L.Q. Weng leg.; ZJUH No. 200705138.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Guangxi, Zhejiang, Hainan).

Remarks

The holotype (from China, Guangdong, Dinghu Mt.) was examined by Zettel (1989), and our interpretation is based on the redescription by Zettel (1989), the original description and the additional Chinese specimens listed above. There are eight females agreeing with the description of *P. bouceki* except for body length (2.6–2.8 mm vs 3.0–3.3 mm for the types). In addition, there are three males agreeing with the description of *P. bouceki*.

Phanerotomella brevifemorata sp. nov.

urn:lsid:zoobank.org:act:718569BB-7EB4-4B3D-87BE-2BDF8F449C33

Figs 21–22

Diagnosis

Hind femur distinctly swollen medially, at most 3.3 × as long as wide (Fig. 22F); metasoma in lateral view strongly curved (Fig. 21); lateral border of metasomal carapace distinctly curved (Fig. 22J); antenna basal third yellow and remainder brown (Fig. 22E); second submarginal cell strongly petiolate, about 1.0 × as long as vein r (Fig. 22G); mesopleuron reticulate and with distinctly smooth area posteriorly (Fig. 22I); face and temple superficially rugulose (Figs 22B, 22C); head yellowish brown but around occipital carina darkened (Fig. 22A); metasoma dark brown except first tergite and second tergite medio-basally yellow (Fig. 22J).

Etymology

Named after the short and wide hind femur; ‘*brevis*’ is Latin for ‘wide’.

Type material

Holotype

CHINA – **Guizhou** • ♀; Fangxiangxiang, Leigong Mt.; elev. 1000 m; 2–3 Jun. 2005; J.X. Liu leg.; ZJUH No. 200605821.

Paratypes (2 ♀♀)

CHINA – **Zhejiang** • 1 ♀; back of West Tianmu Mt.; 3 Jul. 1998; M.S. Zhao leg.; light trap; ZJUH No. 20000148 • 1 ♀; back of West Tianmu Mt.; 30 Jun. 1999; light trap; M.S. Zhao leg.; ZJUH No. 20000535.

Description

Female

MEASUREMENTS. Length of body 2.3 mm, fore wing 2.1 mm.

COLOURATION. Yellow; vertex dark brownish; mesoscutum anteriorly and laterally dark brown; metasoma carapace dark brown except first tergite and second tergite medio-anteriorly yellow; metasoma ventrally white or ivory; scapus pale yellow, basal third of flagellum brownish yellow and remainder brown; mandible whitish and with reddish teeth; fore and middle legs pale yellow except coxa and trochanter white; hind coxa and trochanter white, hind femur yellow, hind tibia brownish yellow and hind tarsus brownish yellow to white; wing veins ivory or whitish, pterostigma and parastigma pale brown.

HEAD (Fig. 22A–C). Width $1.4 \times$ median length in anterior view (Fig. 22B) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 22C); antenna with 19+ segments, slightly widened and shortened medially, gradually narrowing apically, third, fourth and tenth segments 3.2 , 2.7 and $1.5 \times$



Fig. 21. *Phanerotomella brevifemorata* sp. nov., holotype, ♀ (ZJUH No. 200605821), habitus, lateral view. Scale bar: 1.0 mm.



Fig. 22. *Phanerotomella brevifemorata* sp. nov., holotype, ♀ (ZJUH No. 200605821). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Antenna, lateral view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Lamella, posterior view. Scale bars: 0.1 mm.

as long as wide in lateral view, respectively (Fig. 22E); area of stemmaticum transversely striate; OOL:OD:POL=31:10:12; eye as long as temple in dorsal view (Fig. 22A); frons transversely rugulose and with median carina; vertex reticulate-rugose with short setae; temple rugulose; face finely rugulose and with distinct median ridge, dorsally connected to median carina; clypeus finely superficially rugulose and shiny, truncate medio-ventrally; eye width in lateral view $1.1 \times$ maximum width of temple (Fig. 22C), eye height in anterior view $0.7 \times$ minimum width of face (Fig. 22B); malar space rugulose and $1.2 \times$ as long as basal width of mandible; mandible rather slender, lower tooth of mandible $0.5 \times$ as long as apical tooth (Fig. 22D); face width $1.1 \times$ height of face and clypeus together.

MESOSOMA (Fig. 22H–I). Length $1.4 \times$ its width in lateral view (Fig. 22I); side of pronotum superficially rugulose-punctate; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with six short crenulae (Fig. 22H); scutellum finely punctate; mesopleuron reticulate and with distinctly smooth area posteriorly, precoxal sulcus absent; propodeum coarsely reticulate, without median carina, with irregular transverse carina connected to four weak and blunt lateral tubercles.

WINGS (Fig. 22G). Fore wing $2.6 \times$ as long as its maximum width; second submarginal cell strongly petiolate; vein m-cu distinctly antefurcal; vein r straight; vein 1-SR+M and SR1 curved; length of 1-R1 $1.2 \times$ pterostigma; vein r issued far beyond middle of pterostigma and as long as vein r-m; r:2-SR:SR1=7:18:38; vein 1-CU1 $0.4 \times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=16:19:11.

LEGS (Fig. 22F). Hind femur distinctly swollen, $3.3 \times$ as long as wide; longest spur of hind tibia $0.6 \times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

METASOMA (Fig. 22J–K). Elliptical in dorsal view (Fig. 22J), carapace $1.6 \times$ as long as wide and as long as mesosoma; lateral border of metasomal carapace distinctly curved; first to third tergites coarsely reticulate; third tergite $0.9 \times$ as long as second tergite, medial length of third tergite $0.5 \times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of weak and pointed tubercles latero-apically (Fig. 22K).

VARIATION. Length of fore wing of female 2.0–2.1 mm.

Male

Unknown.

Host

Unknown.

Distribution

China (Guizhou, Zhejiang).

Remarks

Phanerotomella brevifemorata sp. nov. is similar to *P. gladia* Chen & Ji, 2003 in having a similar colouration of the body. However, *P. brevifemorata* can be easily distinguished from *P. gladia* by having vein m-cu antefurcal (postfurcal in the latter), the second submarginal cell strongly petiolate (sessile in the latter), the temple in dorsal view narrowing behind the eye (widening in the latter), the hind femur at most $3.3 \times$ as long as wide ($3.9 \times$ in the latter), the basal half of the flagellum yellow and the apical half brown (entirely brown in the latter).

Phanerotomella brevifemorata sp. nov. is similar to *P. longa* Chen & Ji, 2003 because of the flagellum being basally yellowish and apically brown, the second submarginal cell distinctly petiolate, and

the lateral border of the metasoma curved in dorsal view. However, *P. brevifemorata* sp. nov. can be distinguished from *P. longa* by having vein m-cu antefurcal (postfurcal in the latter), the temple in dorsal view narrowing behind the eye (widening in the latter), and the mesopleuron with a smooth area posteriorly (without a smooth area in the latter).

For more comparisons with similar species, see remarks under *P. rugulosa* sp. nov.

Phanerotomella collinsi Zettel, 1989

Figs 23–24

Phanerotomella collinsi Zettel, 1989: 23, 38–39.

Phanerotomella longieyes Chen & Ji, 2003: 181, 187–188, 231, 253. **Syn. nov.**

Phanerotomella pcticornis Chen & Ji, 2003: 181, 195–197, 231, 255. **Syn. nov.**

Diagnosis

Eyes strongly protruding in dorsal view (Fig. 24A); antenna slender (Fig. 24J); metasomal carapace yellow except broadly dark brown medially (Fig. 24I).

Material examined (27 ♀♀, 4 ♂♂)

CHINA – **Zhejiang** • 1 ♀; Songyang; 15–17 Jul. 1989; J.H. He leg.; ZJUH No. 893993 • 1 ♀; Taishun, Wuyanling; 28 Jul–5 Aug. 2005; J.X. Liu leg.; ZJUH No. 200609774 • 2 ♀♀; Linan, Qingliangfeng; 11 Aug. 2005; M. Shi leg.; ZJUH Nos 200603665, 200603666. – **Fujian** • 1 ♀; Jiangle, Longqi Mt.; 8 Jul. 1991; C.M. Liu leg.; ZJUH No. 969883 • 1 ♀; Jiangle, Longqi Mt.; 16 Jul. 1991; C.M. Liu leg.; ZJUH No. 20007043 • 1 ♂; Jiangle, Longqi Mt.; 11 Jul. 1991; C.M. Liu; ZJUH No. 969976 • 1 ♂; Jiangle, Longqi Mt.; 11 Aug. 1991; C.M. Liu; ZJUH No. 9610037 • 1 ♂; Nanjing, Letu; 23 May 1991; C.M.



Fig. 23. *Phanerotomella collinsi* Zettel, 1989, China, ♀ (ZJUH No. 200610610), habitus, lateral view. Scale bar: 1.0 mm.

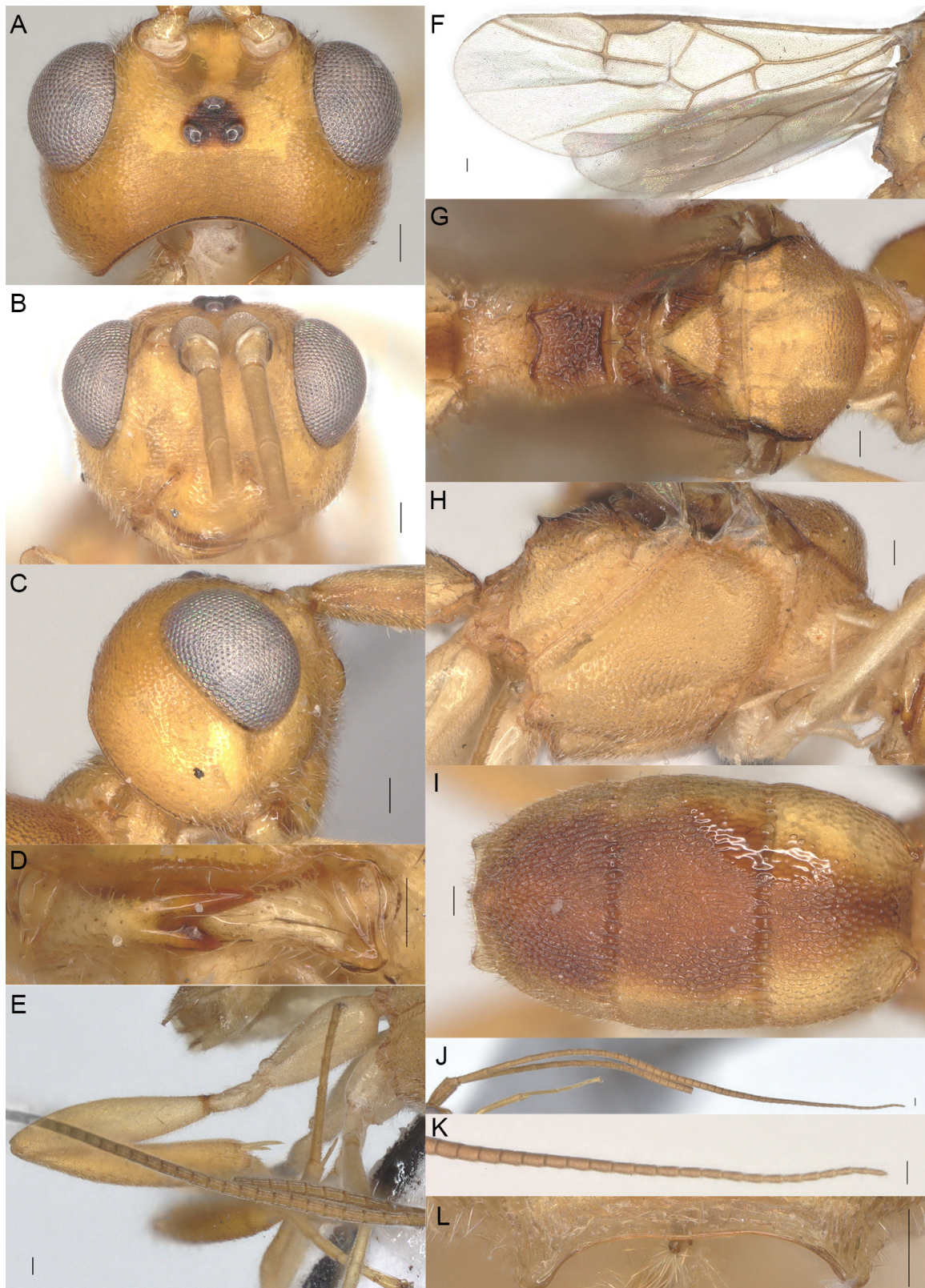


Fig. 24. *Phanerotomella collinsi* Zettel, 1989, China, ♀ (ZJUH No. 200610610). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Hind leg. **F.** Fore and hind wing. **G.** Mesosoma, dorsal view. **H.** Mesosoma, lateral view. **I.** Metasoma, dorsal view. **J.** Antenna, lateral view. **K.** Apical antenna, lateral view. **L.** Lamella, posterior view. Scale bars: 0.1 mm.

Liu; ZJUH No. 20006123 • 2 ♀♀; same data as for preceding; ZJUH Nos 20005999, 20006039 • 1 ♀; Mingqing, Xiongjiang; 13 Jul. 2016; ZJUH No. 201602042. – **Guangdong**, • 1 ♀; Meizhou, Fengxi; 29 Jul. 2003; J.J. Chen leg.; ZJUH No. 20048888 • 1 ♀; Ruyuan, Nanling; 8 May 2004; Z.F. Xu leg.; ZJUH No. 20047747 • 1 ♀; Shaoguan, Nanling; 9–18 Jul. 2005; Y.L. Cai leg.; ZJUH No. 200609621 • 1 ♀; Fogang, Guanyin Mt.; 15 Sep. 2007; J. Zeng leg.; ZJUH No. 200705086. – **Hainan** • 3 ♀♀; Jianfengling; 12–15 Jul. 2006; J.X. Liu leg.; ZJUH Nos 200610605, 200610610, 200610619 • 1 ♀; Jianfengling; 22–23 Nov. 2008; M.M. Wang leg.; ZJUH No. 200805959 • 1 ♀; Diaoluo Mt.; 16 Jul. 2006; J.X. Liu leg.; ZJUH No. 200611324 • 2 ♀♀; Diaoluo Mt.; 16–17 Jul. 2006; J.X. Liu leg.; ZJUH Nos 200802393, 200802403 • 1 ♀; Jianfengling, Tianchi; 12–15 Jul. 2006; L.Q. Weng leg.; ZJUH No. 200803271 • 1 ♀; Jianfengling, Tianchi; 12–15 Jul. 2006; W.Y. Zhang leg.; ZJUH No. 200803450 • 1 ♀; Shuiman, Wuzhi Mt.; 16 May 2007; J. Zeng leg.; ZJUH No. 200705104 • 1 ♀; Diaoluo Mt.; 1 Jun. 2007; J.X. Liu leg.; ZJUH No. 200702334 • 1 ♀; Qiongzong, Limu Mt. Forest Park; 4 May 2010; J.L. Tan leg.; ZJUH No. 201714033. – **Taiwan** • 1 ♀; Kenting Forest Park; 31 May 2011; P. Tang leg.; ZJUH No. 202307614 • 1 ♀; Duona forest trail; 13 Jun. 2011; P. Tang leg.; ZJUH No. 201105038. – **Guizhou** • 1 ♂; Guiyang; 21 May 1981; J.H. He; ZJUH No. 813405.

Host

Unknown.

Distribution

Brunei, China (Fujian, Guangdong, Guizhou, Hainan, Taiwan, Yunnan, Zhejiang), Malaysia.

Remarks

The female holotype of *P. collinsi* from East Malaysia (Borneo, Sarawak) was not examined and our interpretation is based on the original description. There are 27 females agreeing with the description of the holotype of *P. collinsi* except for body length (2.6–3.5 mm vs 3.1–3.5 mm for the types), antenna number (44–49 vs 40–43 for the types), metasomal carapace length–width ratio (1.7–1.8 vs 1.9 for the types), temple–eye ratio in dorsal view (0.8 vs 0.5 for the types). There are four males agreeing with the description of *P. collinsi*.

The female holotypes of *P. longieyes* and *P. picticornis* from China were not available and their interpretation is based on the original descriptions and additional Chinese specimens listed above.

Phanerotomella longieyes and *P. picticornis* are treated as junior synonyms of *P. collinsi* based on the following key characters: (1) vein m-cu postfurcal; (2) second submarginal cell sessile; (3) eye in dorsal view distinctly protruding; (4) antenna slender and with 40–45 segments; (5) mesopleuron densely and finely honeycomb-sculptured but with smooth area posteriorly; (6) mandible slender.

Phanerotomella digitata sp. nov.

[urn:lsid:zoobank.org:act:8320399B-0339-48C4-AB24-08ADC715F3C0](https://zoobank.org/act:8320399B-0339-48C4-AB24-08ADC715F3C0)

Figs 25–26

Diagnosis

Propodeum with pair of distinctly large and finger-shaped tubercles latero-posteriorly (Fig. 26I); vein 1-SR+M strongly concave (Fig. 26G); vein r 0.9 × shorter than vein r-m (Fig. 26G); mandible more robust and inner tooth of mandible longer, 0.5 × as long as apical tooth (Fig. 26D); length of fore wing 5.5 mm (Fig. 26G); scutellum densely and rather finely reticulate and matt (Fig. 26H); temple rugulose and matt (Fig. 26C); hind tarsus white (Fig. 26F); metasoma black except first tergite orange brown (Fig. 26J).

Etymology

Named after a pair of distinctly finger-shaped tuberculate corners of the propodeum postero-laterally; ‘*digitus*’ is Latin for ‘finger’.

Type material

Holotype

CHINA – Yunnan • ♀; Lvchun; 25 Jul. 2003; Z.F. Xu leg.; ZJUH No. 20045216.

Description

Female

MEASUREMENTS. Length of body 6.1 mm, fore wing 5.5 mm.

COLOURATION. Head black; mesosoma orange brown; metasomal carapace black except first tergite yellow; metasoma ventrally white or ivory; antenna dark brown except 3rd–6th segments white; mandible basal half blackish and apical half yellowish and with reddish teeth; fore and middle legs brown except coxa, trochanter and tibia basally white; hind leg dark brown except basal third of coxa, trochanter, tibia basally and first to fourth tarsal segments white; pterostigma dark brown, parastigma reddish brown and wing veins dark brown to pale brown.

HEAD (Fig. 26A–C). Width $1.4 \times$ median length in anterior view (Fig. 26B) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 26C); antenna with 60 segments and $1.8 \times$ as long as fore wing, not widened but shortened medially, gradually narrowing apically, subapical segments non-moniliform



Fig. 25. *Phanerotomella digitata* sp. nov., holotype, ♀ (ZJUH No. 20045216), habitus, lateral view. Scale bar: 1.0 mm.

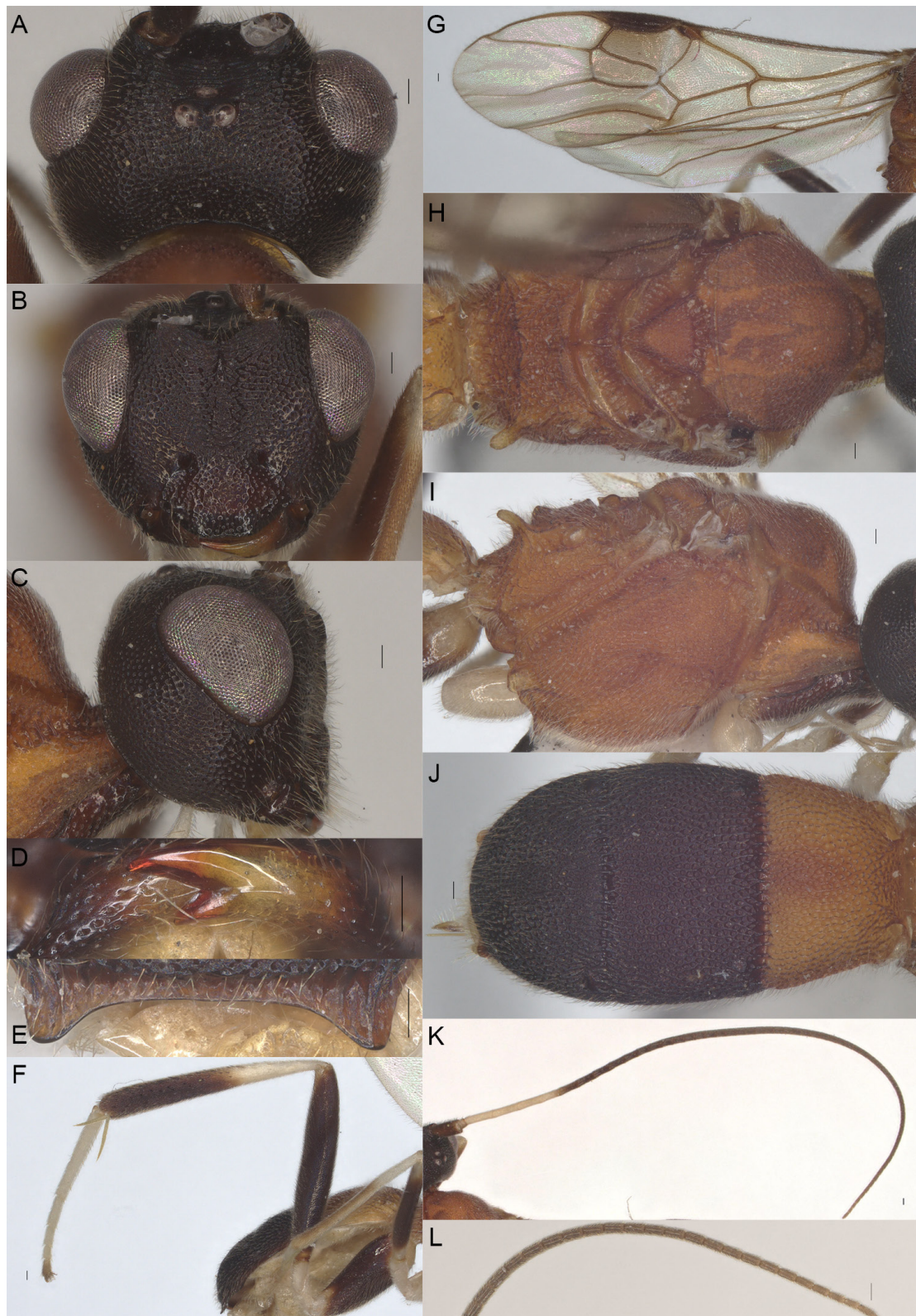


Fig. 26. *Phanerotomella digitata* sp. nov., holotype, ♀ (ZJUH No. 20045216). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

and longer than wide, third, fourth, tenth, fifteenth and penultimate segments 4.0, 3.6, 2.6, 1.8 and 3.0 × as long as wide in lateral view, respectively (Fig. 26K–L); area of stemmaticum transversely striate; OOL:OD:POL=37:10:10; length of eye as long as temple in dorsal view (Fig. 26A); frons transversely rugulose and with median carina; vertex reticulate-rugulose with short setae; temple rugulose-reticulate; face rugulose-reticulate and with distinct median ridge, dorsally connected to median carina; clypeus mainly densely punctate and shiny except basally rugulose, truncate medio-ventrally; eye width in lateral view equal to maximum width of temple (Fig. 26C), eye height in anterior view 0.7 × minimum width of face (Fig. 26B); malar space rugulose-reticulate and 1.3 × as long as basal width of mandible; mandible rather slender, lower tooth of mandible 0.6 × as long as apical tooth (Fig. 26D); face width 0.9 × height of face and clypeus together.

MESOSOMA (Fig. 26H–I). Length 1.4 × its width in lateral view (Fig. 26I); side of pronotum superficially rugulose-punctate; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with seven crenulae (Fig. 26H); scutellum reticulate but posteriorly punctate; mesopleuron regularly reticulate and without distinctly smooth and shiny area posteriorly, with weak but complete precoxal sulcus; propodeum reticulate, without median carina, with irregular transverse carina connected to pair of distinctly large and finger-shaped tuberculate corners latero-posteriorly and two weak and blunt lateral tubercles medio-posteriorly.

WINGS (Fig. 26G). Fore wing 3.1 × as long as its maximum width; second submarginal cell sessile and vein 3-SR distinctly developed; vein m-cu distinctly postfurcal; vein r and vein SR1 straight; vein 1-SR+M concave; length of 1-R1 1.2 × pterostigma; vein r issued far beyond middle of pterostigma, 0.9 × vein r-m; r:2-SR:SR1=13:35:55; vein 1-CU1 0.2 × as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=19:37:14.

LEGS (Fig. 26F). Hind femur 6.0 × as long as wide; longest spur of hind tibia 0.5 × as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; hind tibia slender; middle tibia without ivory blister.

METASOMA (Fig. 26E, J). Oval in dorsal view (Fig. 26J), carapace 1.8 × as long as wide and as long as mesosoma; first to third tergites densely and regularly reticulate; third tergite 0.9 × as long as second tergite, medial length of third tergite 0.6 × its maximum width; lamella of third tergite not protruding medio-apically and with pair of large and blunt tubercles latero-apically (Fig. 26E).

Male

Unknown.

Host

Unknown.

Distribution

China (Yunnan).

Remarks

Phanerotomella digitata sp. nov. is similar to *P. aurantisoma* sp. nov. For a comparison between both taxa, see remarks under *P. aurantisoma*.

Phanerotomella distenticornis sp. nov.

urn:lsid:zoobank.org:act:A7E3BD29-E536-4023-B8E8-0398F4A82BA2

Figs 27–28

Diagnosis

Eye in dorsal view $0.8\times$ as long as temple (Fig. 28A); mesopleuron rugulose and with distinct smooth and shiny area posteriorly (Fig. 28I); 21th–28th segments of antenna at most as long as wide (Fig. 28K); first metasomal tergite distinctly longitudinally striate medially (Fig. 28J).

Etymology

Named after the medially distinctly widened antenna; ‘*distentus*’ is Latin for ‘swollen’.

Type material

Holotype

CHINA – Yunnan • ♀; Deqin, Baima Snow Mt.; 8 Jun. 2009; J.L. Tang leg.; ZJUH No. 202020057.



Fig. 27. *Phanerotomella distenticornis* sp. nov., holotype, ♀ (ZJUH No. 202207749), habitus, lateral view. Scale bar: 1.0 mm.

Paratype

CHINA – Ningxia • 1 ♀; Liupan Mt.; 3–14 Jul. 2009; D.W. Zheng leg.; ZJUH No. 202207749.

Description

Female

MEASUREMENTS. Length of body 3.8 mm, fore wing 3.6 mm.

COLOURATION. Black; metasoma ventrally white or ivory; antenna dark brown; mandible yellowish and with reddish teeth; fore and middle legs brownish yellow except tibia basally whitish; hind leg brownish yellow except tibia apically and femur apical half dark brown; wing veins and parastigma pale brown, pterostigma dark brown.

HEAD (Fig. 28A–C). Width $1.4 \times$ median length in anterior view (Fig. 28B) and part of head above eye in lateral view $0.4 \times$ height of eye (Fig. 28C); antenna with 33 segments and $1.1 \times$ as long as fore wing, distinctly widened and shortened medially, 21st–28th segments about as long as wide, gradually narrowing apically, about 13 subapical segments moniliform, third, fourth, tenth, fifteenth and penultimate segments 3.8 , 3.4 , 1.6 , 1.1 and $1.3 \times$ as long as wide in lateral view, respectively (Fig. 28K–L); area of stemmaticum transversely striate; OOL:OD:POL=47:12:18; eye $0.8 \times$ as long as temple in dorsal view (Fig. 28A); frons transversely rugulose and with median carina; vertex reticulate-rugulose with short setae; temple punctate and shiny; face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus finely punctate and with shiny interspaces, truncate medio-ventrally; eye width in lateral view $0.8 \times$ maximum width of temple (Fig. 28C), eye height in anterior view $0.6 \times$ minimum width of face (Fig. 28B); malar space punctate and $1.4 \times$ as long as basal width of mandible; mandible slender, lower tooth of mandible $0.4 \times$ as long as apical tooth (Fig. 28D); face width equal to height of face and clypeus together.

MESOSOMA (Fig. 28H–I). Length $1.5 \times$ its width in lateral view (Fig. 28I); side of pronotum reticulate-rugulose; mesoscutum regularly and densely reticulate, medio-posteriorly depressed and coarser than anteriorly; notauli absent; scutellar sulcus with seven crenulae (Fig. 28H); scutellum punctate-rugulose; mesopleuron punctate-rugulose and with distinctly smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt lateral tubercles.

WINGS (Fig. 28G). Fore wing $3.0 \times$ as long as its maximum width; second submarginal cell sessile and vein 3-SR developed; vein m-cu postfurcal; second submarginal cell distinctly narrowed anteriorly; veins r and 1-SR+M straight; vein SR1 curved; length of 1-R1 $0.9 \times$ pterostigma; vein r issued far beyond middle of pterostigma, $0.6 \times$ vein r-m; r:2-SR:SR1=4:13:21; vein 1-CU1 $0.3 \times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=35:37:10.

LEGS (Fig. 28F). Hind femur $4.2 \times$ as long as wide; longest spur of hind tibia $0.4 \times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

METASOMA (Fig. 28E, J). Elliptical in dorsal view, carapace $1.7 \times$ as long as wide and $1.1 \times$ as long as mesosoma; first to third tergites densely reticulate-rugose; third tergite $0.9 \times$ as long as second tergite, medial length of third tergite $0.5 \times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of blunt tubercles latero-apically.

VARIATION. Second submarginal cell sessile or vein 3-SR weakly developed; length of fore wing of female 3.4–3.6 mm; around eye, temple and clypeus more or less reddish brown; metasomal carapace 1.7 – $1.9 \times$ as long as wide.

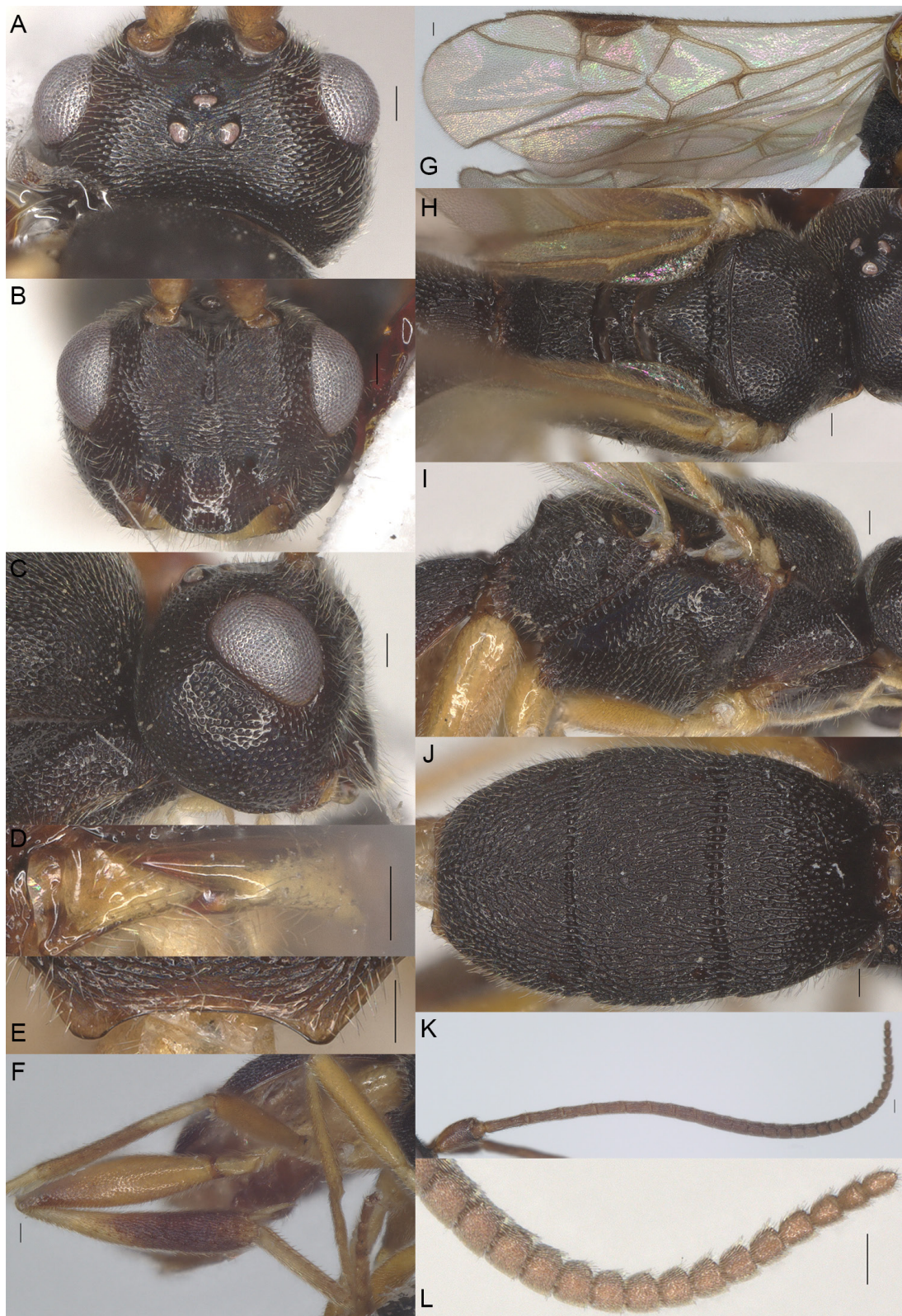


Fig. 28. *Phanerotomella distenticornis* sp. nov., holotype, ♀ (ZJUH No. 202207749). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

Male

Unknown

Host

Unknown

Distribution

China (Ningxia, Yunnan).

Remarks

Phanerotomella distenticornis sp. nov. is similar to *P. nigricaner* Chen & Ji, 2003 because of the black body, the medially widened antenna and the sessile second submarginal cell. However, *P. distenticornis* can be distinguished from *P. nigricaner* by having the eye in dorsal view $0.8\times$ as long as the temple ($1.2\text{--}1.3\times$ in the latter), the mesopleuron with a distinct smooth and a shiny area posteriorly (absent in the latter), 21st–28th segments of the antenna at most as long as wide (longer than wide in the latter), and the first metasomal tergite distinctly longitudinally striate medially (finely honeycomb-like sculptured in the latter).

Phanerotomella emeiensis sp. nov.

[urn:lsid:zoobank.org:act:9D10E1FB-7F2B-4CE7-9EA1-40DE8BF0B023](https://zoobank.org/act:9D10E1FB-7F2B-4CE7-9EA1-40DE8BF0B023)

Figs 29–30

Diagnosis

Inner tooth of mandible $0.6\times$ as long as apical tooth (Fig. 30D); lamella of third metasomal tergite posteriorly with pair of small and blunt tubercles (Fig. 30L); temple and face largely black except yellowish around eye (Fig. 30B–C); head in dorsal view black except yellow spot around eye (Fig. 30A).

Etymology

Named after the collection site of the oldest specimen: Mount Emei in Sichuan.

Type material

Holotype

CHINA – **Zhejiang** • ♀; Anji, Longwang Mt.; 22 Sep. 2004; Y. Ma leg.; ZJUH No. 20050045.

Paratypes (11 ♀♀)

CHINA – **Sichuan** • 1 ♀; Emei Mt., Xixiangchi; elev. 1800–2000 m; 19 Aug. 1957; F.X. Zhu leg.; IOZ(E) No. 2059954 • 1 ♀; Emei Mt.; 10 Aug. 1980; J.H. He leg.; ZJUH No. 802614. – **Zhejiang** • 2 ♀♀; same data as for holotype; ZJUH Nos 20050044, 20050047 • 1 ♀; Linan, Qingliangfeng; 11 Aug. 2005; H.Y. Zhang leg.; ZJUH No. 200603431. – **Shaanxi** • 1 ♀; Huoditang Forest Farm; 33°43.000' N, 108°45.000' E; elev. 1505 m; 14 Aug. 2013; B.B. Tu leg.; light trap; ZJUH No. 201300286 • 2 ♀♀; Fengxian, Huangniupu; 34°15.000' N, 106°58.000' E; elev. 1501 m; 21–22 Aug. 2013; B.B. Tu leg.; yellow pan trap; ZJUH Nos 201300351, 201300352 • 1 ♀; Ningshaan, from Huangguan to Xunyangba; 33°32.400' N, 105°21.600' E; elev. 1236 m; 17 Sep.–5 Oct. 2016; J.L. Tan and Q.Q. Tan leg.; Malaise trap; NWUX • 2 ♀♀; Ningshaan, Foping, Liangfengya; 33°5.400' N, 107°54.000' E; elev. 1729 m; 20 Jul.–26 Nov. 2017; J.L. Tan and Q.Q. Tan leg.; Malaise trap; NWUX.

Description

Female

MEASUREMENTS. Length of body 4.1 mm, fore wing 3.9 mm.

COLOURATION. Black; antenna dark brown except scapus anteriorly whitish; eye dorsally with yellow patches around it; clypeus brownish yellow; mandible whitish to yellowish and with reddish teeth; prothorax yellow; metasomal carapace black except lateral border of first and second tergite yellow; metasoma ventrally white or ivory; fore and middle legs pale brown except coxa and basal tibia white; hind femur yellowish brown except basally whitish, hind tibia dark brown except basally whitish, hind coxa, trochanter and tarsus ivory or pale yellow; pterostigma, parastigma and wing veins brown.



Fig. 29. *Phanerotomella emeiensis* sp. nov., holotype, ♀ (NWUX), habitus, lateral view. Scale bar: 1.0 mm.

HEAD (Fig. 30A–C). Width $1.4\times$ median length in anterior view (Fig. 30B) and part of head above eye in lateral view $0.3\times$ height of eye (Fig. 30C); antenna with 44 segments and $1.6\times$ as long as fore wing, slightly widened and distinctly shortened medially, medial segments about as long as wide, gradually narrowing apically, subapical segments non-moniliform and longer than wide, third, fourth, tenth, fifteenth and penultimate segments 4.6 , 4.3 , 1.7 , 1.1 and $2.3\times$ as long as wide in lateral view, respectively (Fig. 30J–K); area of stemmaticum transversely striate; OOL:OD:POL=33:8:10; length of eye $0.7\times$ temple in dorsal view (Fig. 30A); frons transversely rugulose-reticulate and with median carina; vertex reticulate-rugose with short setae; temple punctate and shiny; face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus smooth except for fine punctation, distinctly truncate medio-ventrally; eye width in lateral view $0.7\times$ maximum width of temple (Fig. 30C), eye height in anterior view $0.6\times$ minimum width of face (Fig. 30B); malar space punctate and $0.8\times$ as long as basal width of mandible; mandible rather robust, lower tooth of mandible $0.6\times$ as long as apical tooth (Fig. 30D); face width $1.1\times$ height of face and clypeus together.

MESOSOMA (Fig. 30G–H). Length $1.4\times$ its width in lateral view (Fig. 30H); side of pronotum superficially punctate-rugulose; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with seven short crenulae (Fig. 30G); scutellum mainly punctate and shiny except basally rugulose; mesopleuron distinctly punctate and without smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt tubercles laterally.

WINGS (Fig. 30F). Fore wing $3.0\times$ as long as its maximum width; second submarginal cell distinctly petiolate; vein m-cu distinctly postfurcal; vein r and vein SR1 straight; vein 1-SR+M somewhat curved; length of 1-R1 $1.1\times$ pterostigma; vein r issued far beyond middle of pterostigma, $1.4\times$ vein r-m; r:2-SR:SR1=15:34:71; vein 1-CU1 $0.2\times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=25:43:15.

LEGS (Fig. 30E). Hind femur $4.1\times$ as long as wide; longest spur of hind tibia $0.6\times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; hind tibia slender; middle tibia without ivory blister.

METASOMA (Fig. 30I, L). Oval in dorsal view (Fig. 30I), carapace $1.7\times$ as long as wide and as long as mesosoma; first to third tergites densely reticulate-rugulose; third tergite $1.1\times$ as long as second tergite, medial length of third tergite $0.6\times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of small and blunt tubercles latero-apically (Fig. 30L).

VARIATION. Second submarginal cell weakly petiolate or rarely sessile; length of fore wing of female 3.5–3.9 mm; antenna of female with 43 or 44 segments; yellow patches around eye more or less enlarged; mesoscutum medio-posteriorly and lateral border of second metasomal tergite more or less yellow; third antennal segments basally more or less whitish.

Male

Unknown.

Host

Unknown.

Distribution

China (Shaanxi, Sichuan, Zhejiang).

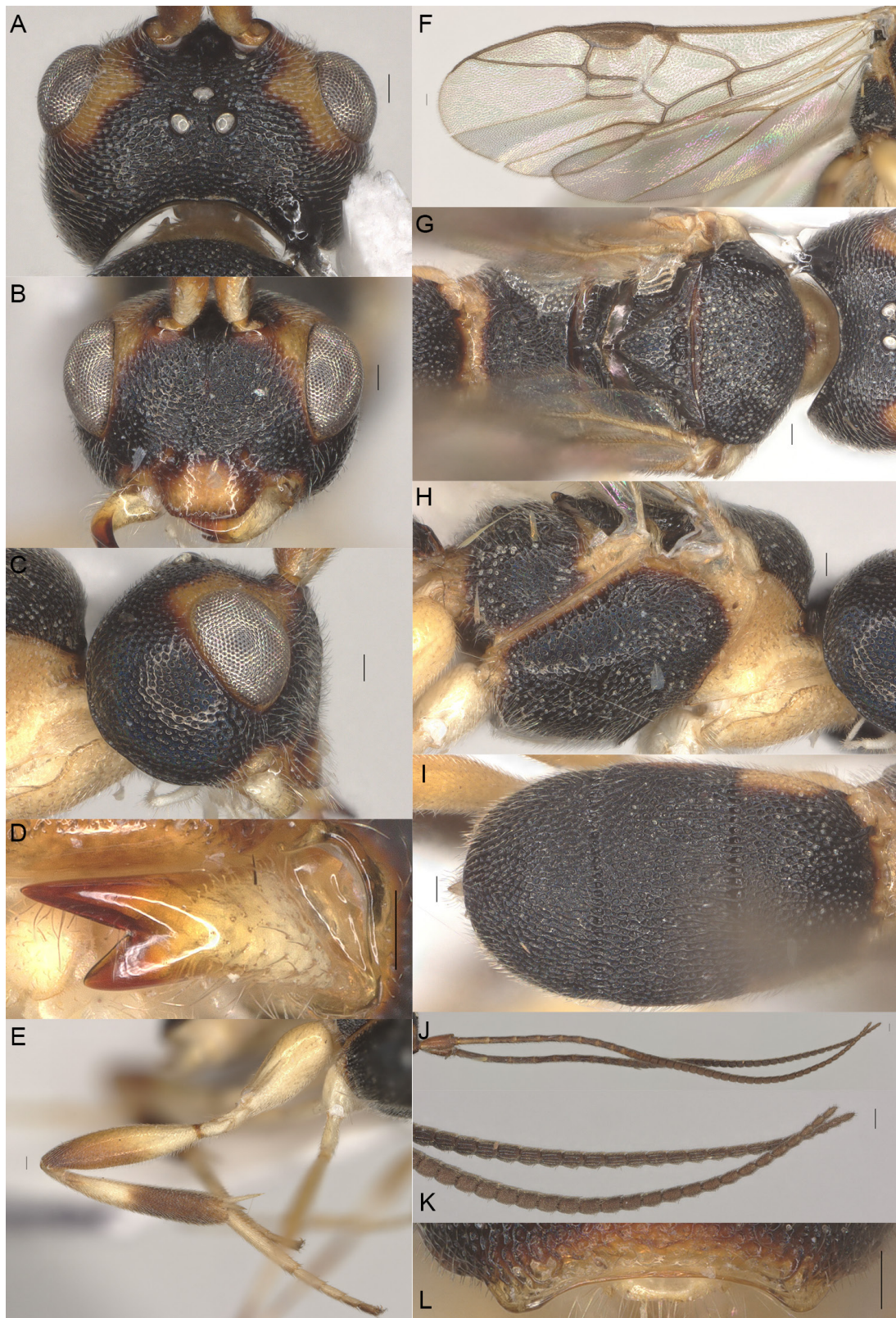


Fig. 30. *Phanerotomella emeiensis* sp. nov., holotype, ♀ (NWUX). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Hind leg. **F.** Fore and hind wing. **G.** Mesosoma, dorsal view. **H.** Mesosoma, lateral view. **I.** Metasoma, dorsal view. **J.** Antenna, lateral view. **K.** Apical antenna, lateral view. **L.** Lamella, posterior view. Scale bars: 0.1 mm.

Remarks

Phanerotomella emeiensis sp. nov. is similar to *P. flavigena* sp. nov. because of the comparatively small eye in dorsal view, $0.6\times$ as long as the temple, the basal half of the hind femur being pale yellow and the apical half brown, the face rugose, and the temple and mesopleuron punctate and with a satin sheen. However, *P. emeiensis* can be distinguished from *P. flavigena* by having the inner tooth of the mandible $0.6\times$ as long as the apical tooth ($0.4\times$ in the latter), the lamella of the third metasomal tergite posteriorly with two small and blunt tubercles (without tubercles in the latter), the temple and face largely black except yellowish around the eye (temple and face entirely yellow in the latter), and the head in dorsal view black except for a yellow spot around the eye (head in dorsal view reddish brown without yellow spot around eye in the latter).

Phanerotomella exilicornis sp. nov.

[urn:lsid:zoobank.org:act:9155EF2B-0F92-4AF0-A5FD-B2262B9D17C9](https://zoobank.org/urn:lsid:zoobank.org:act:9155EF2B-0F92-4AF0-A5FD-B2262B9D17C9)

Figs 31–32

Diagnosis

Scapus and pedicellus in lateral view ivory and distinctly contrasting with dark brown flagellum (Fig. 32D); mesopleuron reticulate and without smooth and shiny area posteriorly (Fig. 32J); lamella of third metasomal tergite not protruding medio-apically (Fig. 32L); clypeus in lateral view less protruding (Fig. 32C); temple distinctly rugulose and matt (Fig. 32C).

Etymology

Named after its slender antenna; ‘*exilis*’ is Latin for ‘slender’.

Type material

Holotype

CHINA – Hainan • ♀; Shuimanxiang, Wuzhi Mt.; 16–18 May 2007; J. Zeng leg.; ZJUH No. 200807665.

Paratypes (2 ♀♀)

CHINA – Hainan • 1 ♀; Shuiman, Wuzhi Mt.; 16 May 2007; J. Zeng leg.; ZJUH No. 200705124 • 1 ♀; Yinggeling; 24–25 May 2007; J.X. Liu leg.; ZJUH No. 200702676.

Description

Female

MEASUREMENTS. Length of body 3.0 mm, fore wing 2.6 mm.

COLOURATION. Black; head reddish brown and darkened around occipital carina, but face yellowish brown and clypeus yellow; antenna dark brown except for white scapus and pedicellus; mandible yellowish and with reddish teeth; metasoma ventrally white or ivory; fore and middle legs brown except coxa, trochanter and base of tibia white, tarsus pale yellow; hind leg dark brown except base of coxa, trochanter and base of tibia white, tarsus pale yellow; pterostigma and parastigma brown, wing veins pale brown.

HEAD (Fig. 32A–C). Width $1.4\times$ median length in anterior view (Fig. 32B) and part of head above eye in lateral view $0.3\times$ height of eye (Fig. 32C); antenna with 35+ segments, not widened and only shortened medially, gradually narrowing apically, subapical segments non-moniliform and slightly longer than wide, third, fourth, tenth and fifteenth segments 4.0 , 3.7 , 1.8 and $1.5\times$ as long as wide in lateral view, respectively (Fig. 32D); area of stemmaticum transversely striate; OOL:OD:POL=35:11:8; eye $1.6\times$ as long as temple in dorsal view (Fig. 32A); frons transversely rugulose and with median carina; vertex

reticulate-rugose with short setae; temple rugulose and matt; face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus smooth and shiny except for finely punctation, truncate medio-ventrally; eye width in lateral view $1.5 \times$ maximum width of temple (Fig. 32C), eye height in anterior view $0.8 \times$ minimum width of face (Fig. 32B); malar space rugulose and $1.2 \times$ as long as basal width of mandible; mandible rather slender, lower tooth of mandible $0.4 \times$ as long as apical tooth (Fig. 32F); face width equal to height of face and clypeus together.



Fig. 31. *Phanerotomella exilicornis* sp. nov., holotype, ♀ (ZJUH No. 200807665), habitus, lateral view. Scale bar: 1.0 mm.

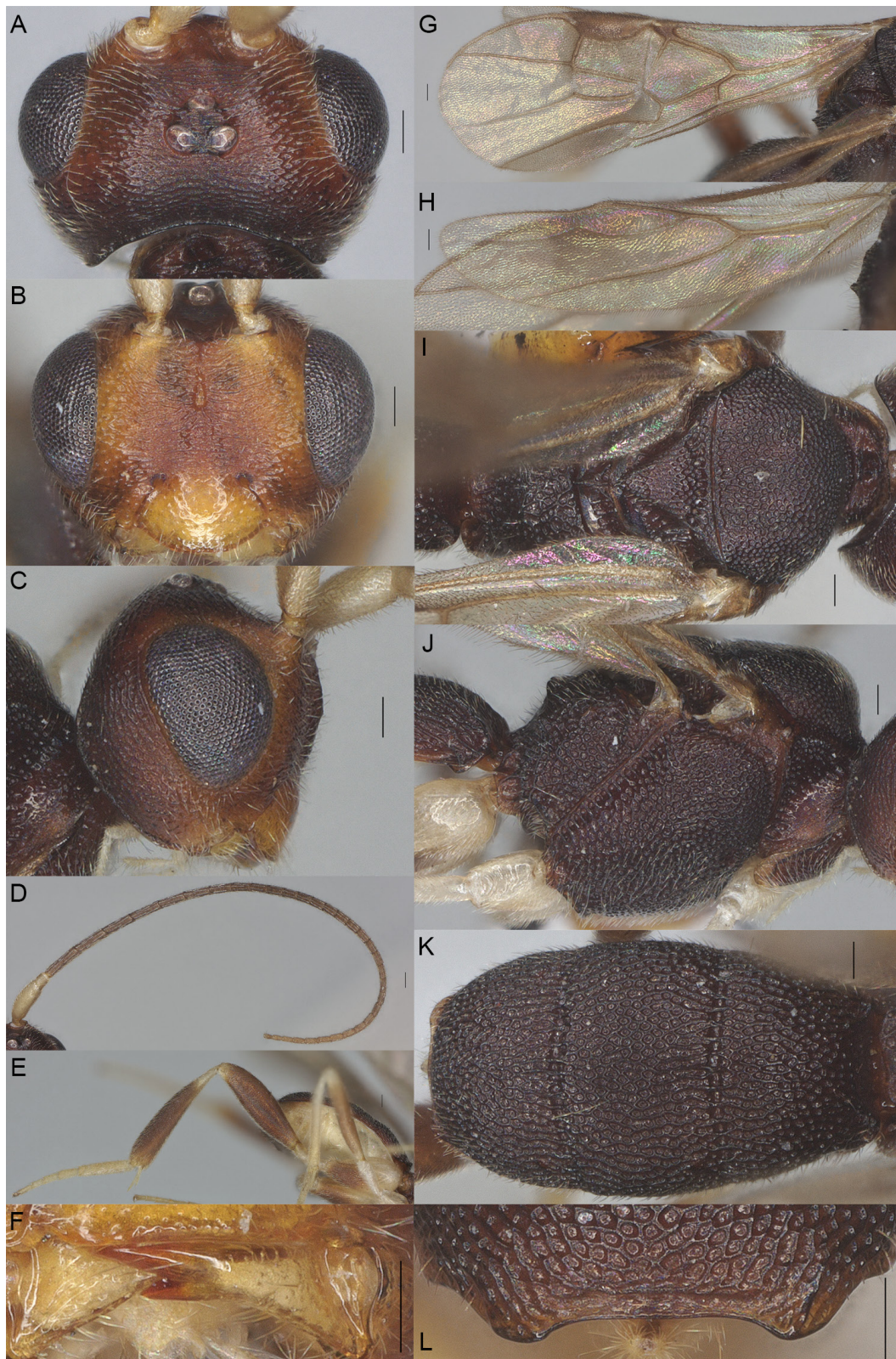


Fig. 32. *Phanerotomella exilicornis* sp. nov., holotype, ♀ (ZJUH No. 200807665). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Hind leg. **F.** Mandible, ventral view. **G.** Fore wing. **H.** Hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Lamella, posterior view. Scale bars: 0.1 mm.

MESOSOMA (Fig. 32I–J). Length $1.2 \times$ its width in lateral view (Fig. 32J); side of pronotum mainly superficially and finely punctate except anteriorly rugulose; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with six short crenulae (Fig. 32I); scutellum reticulate; mesopleuron densely and regularly reticulate and without smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt lateral tubercles.

WINGS (Fig. 32G–H). Fore wing $2.7 \times$ as long as its maximum width (Fig. 32G); second submarginal cell weakly petiolate; vein m-cu weakly postfurcal; vein r, SR1 and 1-SR+M straight; length of 1-R1 $1.2 \times$ pterostigma; vein r issued far beyond middle of pterostigma, $1.3 \times$ vein r-m; r:2-SR:SR1 = 17:39:67; vein 1-CU1 $0.4 \times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m = 28:40:12 (Fig. 32H).

LEGS (Fig. 32E). Hind femur $3.7 \times$ as long as wide; longest spur of hind tibia $0.6 \times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

METASOMA (Fig. 32K–L). Oval in dorsal view (Fig. 32K), carapace $1.7 \times$ as long as wide and as long as mesosoma; first to third tergites densely reticulate-rugose; third tergite $0.8 \times$ as long as second tergite, medial length of third tergite $0.5 \times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of small and blunt tubercles latero-apically (Fig. 32L).

VARIATION. Vein m-cu of fore wing weakly antefurcal or interstitial.

Male

Unknown.

Host

Unknown.

Distribution

China (Hainan).

Remarks

Phanerotomella exilicornis sp. nov. is similar to *P. albiscapa* (Ashmead, 1905) because of the slender antenna of the female, all flagellum segments are longer than wide and the subapical segments non-moniliform, the posterior ocelli are large and round, and the temple in dorsal view narrows posteriorly. However, *P. exilicornis* can easily be distinguished from *P. albiscapa* by the scapus and pedicellus in lateral view being ivory and distinctly contrasting with the dark brown flagellum (antenna brown in the latter), the mesopleuron without a smooth and shiny area posteriorly (with a smooth area in the latter), the lamella of the third metasomal tergite not protruding medio-apically (protruding medio-apically in the latter), and the temple distinctly rugulose and matt (superficially rugulose and shiny in the latter).

Phanerotomella flavigena sp. nov.

[urn:lsid:zoobank.org:act:503C63CA-3EB3-4E23-A32D-1248935AD730](https://zoobank.org/urn:lsid:zoobank.org:act:503C63CA-3EB3-4E23-A32D-1248935AD730)

Figs 33–34

Diagnosis

Inner tooth of mandible $0.4 \times$ as long as apical tooth (Fig. 34D); lamella of third metasomal tergite posteriorly without tubercles (Fig. 34M); temple and face entirely yellow (Fig. 34B–C); head in dorsal view reddish brown without yellow spot around eye (Fig. 34A).



Fig. 33. *Phanerotomella flavigena* sp. nov., holotype, ♀ (ZJUH No. 999890), habitus, lateral view. Scale bars: 1.0 mm.

Etymology

Named after the yellow temple; '*flavus*' in Latin is 'yellow'.

Type material

Holotype

CHINA – **Zhejiang** • ♀; West Tianmu Mt., Daheng Road; 28 Jul. 1999; M.S. Zhao leg.; Malaise trap; ZJUH No. 999896.

Paratypes (9 ♀♀, 3 ♂♂)

CHINA – **Zhejiang** • 5 ♀♀; West Tianmu Mt., Xianrending; 4 Jul. 1998; M.S. Zhao leg.; ZJUH Nos 992257, 992262, 992269, 992273, 200010676 • 1 ♀; same data as for holotype; ZJUH No. 999898 • 3 ♀♀; Taishun, Wuyanling; 1–2 Aug. 2005; Y.P. Wang leg.; Malaise trap; ZJUH Nos 200604959, 200604970, 200604974. – **Yunnan** • 1 ♂; Lvchun, Fenshuiling; 25 Jul. 2003; T.J. Li leg.; ZJUH No. 20045700. – **Guangdong** • 1 ♂; Ruyuan, Nanling; 4 Aug. 2004; Z.F. Xu leg.; ZJUH No. 20047787. – **Guizhou** • 1 ♂; Fanjing Mt., Jinding; 12 Jul. 1993; X.X. Chen leg.; ZJUH No. 937831.

Description

Female

MEASUREMENTS. Length of body 4.2 mm, fore wing 3.9 mm.

COLOURATION. Blackish brown; temple, face and clypeus yellow; antenna dark brown except scapus anteriorly white; mandible yellowish and with reddish teeth; prothorax yellow except pronotum dorsally brownish; anterior subalar depression yellow; lateral border of first metasomal tergite yellow; metasoma ventrally white or ivory; fore and middle legs yellow except coxa and trochanter white; hind leg dark brown except coxa, trochanter, bases of femur and tibia white; pterostigma, parastigma and wing veins dark brown.

HEAD (Fig. 34A–C). Width $1.5 \times$ median length in anterior view (Fig. 34B) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 34C); antenna with 43 segments and $1.6 \times$ as long as fore wing, not widened but shortened medially, gradually narrowing apically, subapical segments non-moniliform and longer than wide, third, fourth, tenth, fifteenth and penultimate segments 4.2, 3.8, 2.4, 1.3 and $2.0 \times$ as long as wide in lateral view, respectively (Fig. 34E–F); area of stemmaticum transversely striate; OOL:OD:POL=38:11:10; eye $0.7 \times$ as long as temple in dorsal view (Fig. 34A); frons transversely rugulose and with median carina; vertex reticulate-rugose with short setae; temple finely punctate and shiny; face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus smooth and shiny except for finely punctation, distinctly truncate medio-ventrally; eye width in lateral view $0.7 \times$ maximum width of temple (Fig. 34C), eye height in anterior view $0.6 \times$ minimum width of face (Fig. 34B); malar space finely punctate and $0.7 \times$ as long as basal width of mandible; mandible rather robust, lower tooth of mandible $0.5 \times$ as long as apical tooth (Fig. 34D); face width $1.1 \times$ height of face and clypeus together.

MESOSOMA (Fig. 34J–K). Length $1.5 \times$ its width in lateral view (Fig. 34K); side of pronotum superficially rugulose-punctate; mesoscutum medio-posteriorly slightly depressed and coarsely punctate and remainder comparatively finely punctate; notauli absent; scutellar sulcus with seven short crenulae (Fig. 34J); scutellum mainly punctate and shiny except basally reticulate; mesopleuron punctate and shiny and without distinctly smooth area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt lateral tubercles.

WINGS (Fig. 34H–I). Fore wing $2.7 \times$ as long as its maximum width (Fig. 34H); second submarginal cell weakly petiolate; vein m-cu postfurcal; vein r and vein SR1 straight; vein 1-SR+M slightly

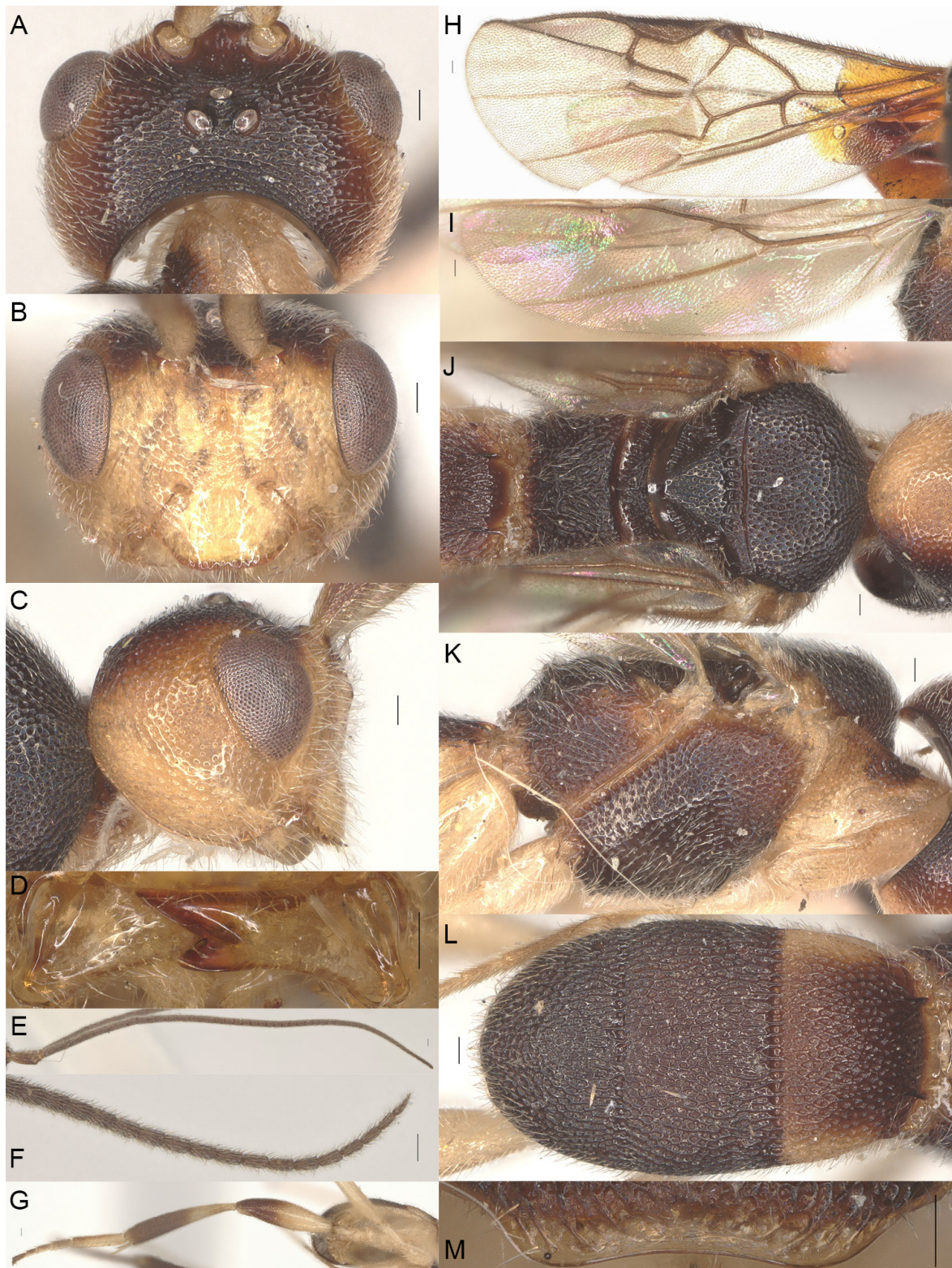


Fig. 34. *Phanerotomella flavigena* sp. nov. **A–C, E–G, J–L.** Holotype, ♀ (ZJUH No. 999890). **D, I, M.** Paratype, ♀ (ZJUH No. 999896). **H.** Paratype, ♀ (ZJUH No. 200604959). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Antenna, lateral view. **F.** Apical antenna, lateral view. **G.** Hind leg. **H.** Fore wing. **I.** Hind wing. **J.** Mesosoma, dorsal view. **K.** Mesosoma, lateral view. **L.** Metasoma, dorsal view. **M.** Lamella, posterior view. Scale bars: 0.1 mm.

concave; length of 1-R1 $1.1 \times$ pterostigma; vein r issued far beyond middle of pterostigma, $1.0 \times$ vein r-m; r:2-SR:SR1=14:41:75; vein 1-CU1 $0.3 \times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=39:55:16 (Fig. 34I).

LEGS (Fig. 34G). Hind femur $3.9 \times$ as long as wide; longest spur of hind tibia $0.5 \times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

METASOMA (Fig. 34L–M). Oval in dorsal view (Fig. 34L), $1.8 \times$ as long as wide and $1.0 \times$ as long as mesosoma; first to third tergites densely reticulate-rugulose; third tergite $1.0 \times$ as long as second tergite, medial length of third tergite $0.6 \times$ its maximum width; lamella of third tergite straight and without 2 tubercles latero-apically (Fig. 34M).

VARIATION. Second submarginal cell weakly petiolate or rarely sessile; length of fore wing of female 3.5–3.9 mm; antenna of female with 41–45 segments.

Male

Very similar to female.

Host

Unknown

Distribution

China (Guangdong, Guizhou, Yunnan, Zhejiang).

Remarks

Phanerotomella flavigena sp. nov. is similar to *P. emeiensis* sp. nov. For a comparison between both taxa, see remarks under *P. emeiensis*.

Phanerotomella fulgida sp. nov.

[urn:lsid:zoobank.org:act:6F7595D3-86BA-44FA-BE7F-290AD4514FC9](https://zoobank.org/act:6F7595D3-86BA-44FA-BE7F-290AD4514FC9)

Figs 35–36

Diagnosis

Basal carina of first metasomal tergite weakly developed (Fig. 36J); first metasomal tergite finely reticulate (Fig. 36J); apex of metasoma flatter (Fig. 36J); temple smooth and with satin sheen (Fig. 36C); mesopleuron irregularly reticulate (Fig. 36I).

Etymology

Named after its shiny temple; '*fulgidus*' is Latin for 'shiny'.

Type material

Holotype

CHINA – Yunnan • ♀; Xishuangbanna Forest Park; 31 Jul. 2003; L. Hu leg.; ZJUH No. 20048119.

Paratypes (2 ♀♀, 1 ♂)

CHINA – Yunnan • 1 ♂; same data as for holotype; ZJUH No. 20048113 • 1 ♀; same data as for preceding; ZJUH No. 20048111 • 1 ♀; Nabanhe Reserve, Naban Tea Factory; 22°9.514' N, 100°39.917' E; elev. 709 m; 30 Jul. 2007; Aweigel leg.; Malaise trap; IOZ(E) No. 2059955.

Description

Female

MEASUREMENTS. Length of body 3.5 mm, fore wing 3.2 mm.

COLOURATION. Black; metasomal carapace black except first tergite and second tergite medio-anteriorly yellow; metasoma ventrally white or ivory; antenna dark brown except scapus and pedicellus yellowish; face and clypeus reddish black; mandible yellowish and with reddish teeth; fore and middle legs yellowish brown except coxa and trochanter white; hind leg dark brown except coxa, trochanter, and tibia basally white; wing veins and parastigma pale brown, pterostigma dark brown.

HEAD (Fig. 36A–C). Width $1.4\times$ median length in anterior view (Fig. 36B) and part of head above eye in lateral view $0.2\times$ height of eye (Fig. 36C); antenna with 40 segments and $1.6\times$ as long as fore wing, slightly widened and shortened medially, gradually narrowing apically, subapical segments non-moniliform and longer than wide, third, fourth, tenth, fifteenth and penultimate segments 3.7 , 3.6 , 1.6 , 1.1 and $3.0\times$ as long as wide in lateral view, respectively (Fig. 36K–L); area of stemmaticum transversely striate; OOL:OD:POL=45:12:15; length of eye $0.8\times$ temple in dorsal view (Fig. 36A); frons transversely finely rugulose and with median carina; vertex finely rugulose-reticulate with short setae; temple smooth and shiny except very densely punctate; face finely rugulose and with distinct median ridge, dorsally connected to median carina; clypeus smooth except finely punctate, truncate medio-ventrally; eye width in lateral view $0.8\times$ maximum width of temple (Fig. 36C), eye height in anterior view $0.7\times$ minimum width of face (Fig. 36B); malar space smooth and $0.9\times$ as long as basal width of mandible; mandible somewhat robust, lower tooth of mandible $0.5\times$ as long as apical tooth (Fig. 36D); face width $1.1\times$ height of face and clypeus together.

MESOSOMA (Fig. 36H–I). Length $1.3\times$ its width in lateral view (Fig. 36I); side of pronotum superficially punctate; mesoscutum regularly and densely reticulate except medio-posteriorly slightly stronger than



Fig. 35. *Phanerotomella fulgida* sp. nov., holotype, ♀ (ZJUH No. 20048119), habitus, lateral view. Scale bar: 1.0 mm.

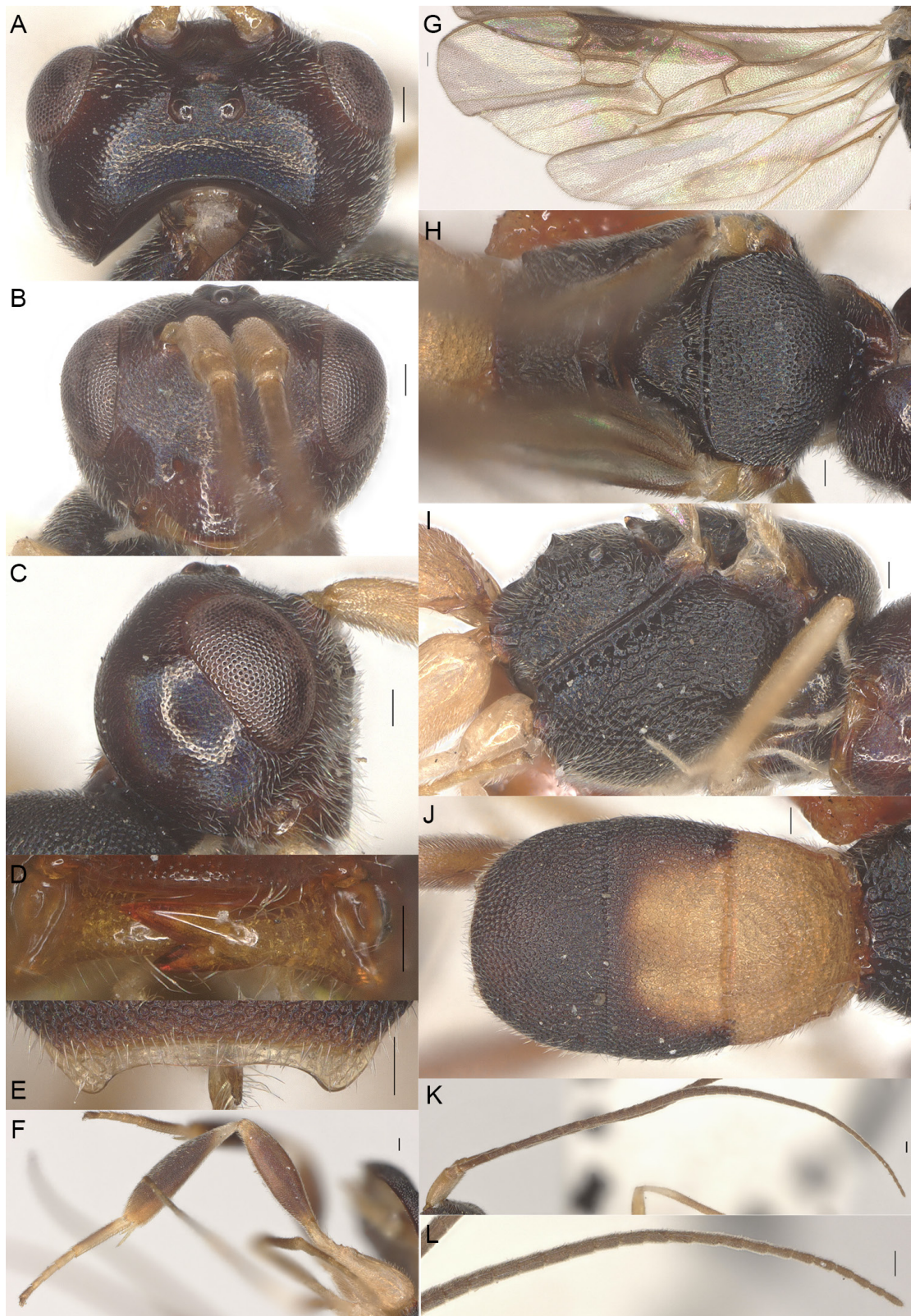


Fig. 36. *Phanerotomella fulgida* sp. nov., holotype, ♀ (ZJUH No. 20048119). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

anteriorly; notauli absent; scutellar sulcus with five crenulae (Fig. 36H); scutellum superficially reticulate and matt but posteriorly punctate and shiny; mesopleuron distinctly irregularly reticulate and without smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt lateral tubercles.

WINGS (Fig. 36G). Fore wing $3.1\times$ as long as its maximum width; second submarginal cell weakly petiolate; vein m-cu distinctly postfurcal; vein r straight; vein 1-SR+M and SR1 somewhat curved; 1-R1 as long as pterostigma; vein r issued far beyond middle of pterostigma and as long as vein r-m; $r:2\text{-SR}:SR1=13:35:56$; vein 1-CU1 $0.4\times$ as long as vein 2-CU1. Hind wing: $M+CU:1\text{-M}:1r\text{-m}=32:35:15$.

LEGS (Fig. 36F). Hind femur $3.7\times$ as long as wide; longest spur of hind tibia $0.5\times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

METASOMA (Fig. 36E, J). Oval in dorsal view (Fig. 36J), carapace $1.6\times$ as long as wide and $1.1\times$ as long as mesosoma; first to third tergites densely reticulate-rugose; third tergite $1.2\times$ as long as second tergite, medial length of third tergite $0.6\times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of small and blunt tubercles latero-apically (Fig. 36E).

VARIATION. None observed.

Male

Very similar to female, but antenna slender medially, second metasomal tergite largely black except medio-anteriorly with small yellow patch, hind femur yellow.

Host

Unknown.

Distribution

China (Yunnan).

Remarks

Phanerotomella fulgida sp. nov. is similar to *P. bicolorata* He & Chen, 1995 because the head in dorsal view is rather transverse, the temple in dorsal view parallel-sided behind the eye, the antenna slender, and the scapus and pedicellus yellow, contrasting with the brown flagellum. However, *P. fulgida* can be distinguished from *P. bicolorata* by having the basal carina of the first metasomal tergite weakly developed (distinctly developed in the latter), the first metasomal tergite finely reticulate (distinctly longitudinally striate in the latter), the apex of the metasoma flatter (less flat in the latter), the temple smooth and with a satin sheen (distinctly finely punctate and shiny in the latter), and the mesopleuron irregularly reticulate (mesopleuron coarsely rugose).

Phanerotomella fuscitibialis sp. nov.

[urn:lsid:zoobank.org:act:F35A0FEF-EE12-437F-86C3-4CFAA6B0C507](https://zoobank.org/urn:lsid:zoobank.org:act:F35A0FEF-EE12-437F-86C3-4CFAA6B0C507)

Figs 37–38

Diagnosis

Apex of metasoma truncate in dorsal view (Fig. 38J); mesopleuron reticulate and with distinctly smooth area posteriorly (Fig. 38I); head brown (Fig. 38A); metasoma blackish and at most first and second tergites medially with brownish patches (Fig. 38J); lamella of third metasomal tergite wide and with pair of blunt tubercles (Fig. 38L); face and temple rugulose (Fig. 38B–C).

Etymology

Named after the laterally darkened hind tibia; '*fuscus*' is Latin for 'brown'.

Type material

Holotype

CHINA – Xizang • ♀; Linzhi, Yigong Tea Farm, Laosanlian; 5 Aug. 2019; yellow pan trap; ZJUH No. 202307980.



Fig. 37. *Phanerotomella fuscitibialis* sp. nov., holotype, ♀ (ZJUH No. 202307980), habitus, lateral view. Scale bar: 1.0 mm.

Paratypes (15 ♀♀)

CHINA – **Xizang** • 7 ♀♀; Linzhi, Yigong Tea Farm, Laosanlian; 5 Aug. 2019; yellow pan trap; ZJUH Nos 202307658, 202307704, 202307750, 202307796, 2023077842, 202307843, 202307888 • 2 ♀♀; Linzhi, Yigong Tea Farm, Laosanlian; 5 Aug. 2019; Q. Wu leg.; ZJUH Nos 202307705, 202307751 • 1 ♀; Linzhi; Yigong Tea Farm, Laosanlian; 5 Aug. 2019; X.Z. Ma and Z.K. Li leg.; ZJUH No. 202307569 • 1 ♀; Linzhi, Yigong Tea Farm, Laosanlian; 5 Aug. 2019; Y. Li leg.; ZJUH No. 202307890 • 1 ♀; Linzhi, Yigong Tea Farm; 3 Aug. 2019; P. Tang leg.; ZJUH No. 202307889 • 1 ♀; S bank of Yigong Lake; 4 Aug. 2019; X.Z. Ma leg.; ZJUH No. 202307660 • 1 ♀; Linzhi, Yigong, Tongjia Village; 6 Aug. 2019; X.F. Li leg.; ZJUH No. 202307505 • 1 ♀; Linzhi, Bomi, Gang Village; 9 Aug. 2019; C.H. Wang leg.; ZJUH No. 202307611.

Description

Female

MEASUREMENTS. Length of body 2.6 mm, fore wing 2.4 mm.

COLOURATION. Black; head yellowish brown except vertex and frons dark brown; clypeus yellow; antenna brown except for scapus anteriorly yellowish; mandible yellowish and with reddish teeth; prothorax, mesopleuron and metapleuron brownish yellow; first and second metasomal tergites medially with brownish patches; metasoma ventrally white or ivory; fore and middle legs pale yellow except tibia and tarsus darkened to brownish yellow; hind leg brownish yellow except tibia and tarsus dark brown; wing veins and parastigma brown, pterostigma dark brown.

HEAD (Fig. 38A–C). Width $1.3 \times$ median length in anterior view (Fig. 38B) and part of head above eye in lateral view $0.5 \times$ height of eye (Fig. 38C); antenna with 34 segments and $1.3 \times$ as long as fore wing, slightly widened and shortened medially, gradually narrowing apically, 20th–22nd subapical segments moniliform and suddenly wider than long followed by longer segments up to apex, third, fourth, tenth, fifteenth and penultimate segments 3.2, 3.0, 1.5, 1.3 and $2.0 \times$ as long as wide in lateral view, respectively (Fig. 38D–E); area of stemmaticum transversely striate; OOL:OD:POL=31:7:10; length of eye $1.3 \times$ temple in dorsal view (Fig. 38A); frons transversely finely rugulose and with median carina; vertex finely rugulose with short setae; temple rugulose; face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus smooth and shiny except for finely punctuation, truncate medio-ventrally; eye width in lateral view $1.4 \times$ maximum width of temple (Fig. 38C), eye height in anterior view $0.8 \times$ minimum width of face (Fig. 38B); malar space rugulose and $1.7 \times$ as long as basal width of mandible; mandible somewhat slender, lower tooth of mandible $0.5 \times$ as long as apical tooth (Fig. 38F); face width $1.1 \times$ height of face and clypeus together.

MESOSOMA (Fig. 38H–I). Length $1.5 \times$ its width in lateral view (Fig. 38I); side of pronotum superficially rugulose-punctate; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with five crenulae (Fig. 38H); scutellum superficially reticulate; mesopleuron densely reticulate and with distinctly smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt tubercles laterally.

WINGS (Fig. 38G). Fore wing $3.0 \times$ as long as its maximum width; second submarginal cell sessile; vein m-cu interstitial; veins r, SR1 and 1-SR+M straight; length of 1-R1 $1.4 \times$ pterostigma; vein r issued far beyond middle of pterostigma, $1.1 \times$ vein r-m; r:2-SR:SR1=17:39:80; vein 1-CU1 $0.5 \times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=23:38:16.

LEGS (Fig. 38K). Hind femur $3.8 \times$ as long as wide; longest spur of hind tibia $0.5 \times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctuation; middle tibia without ivory blister.

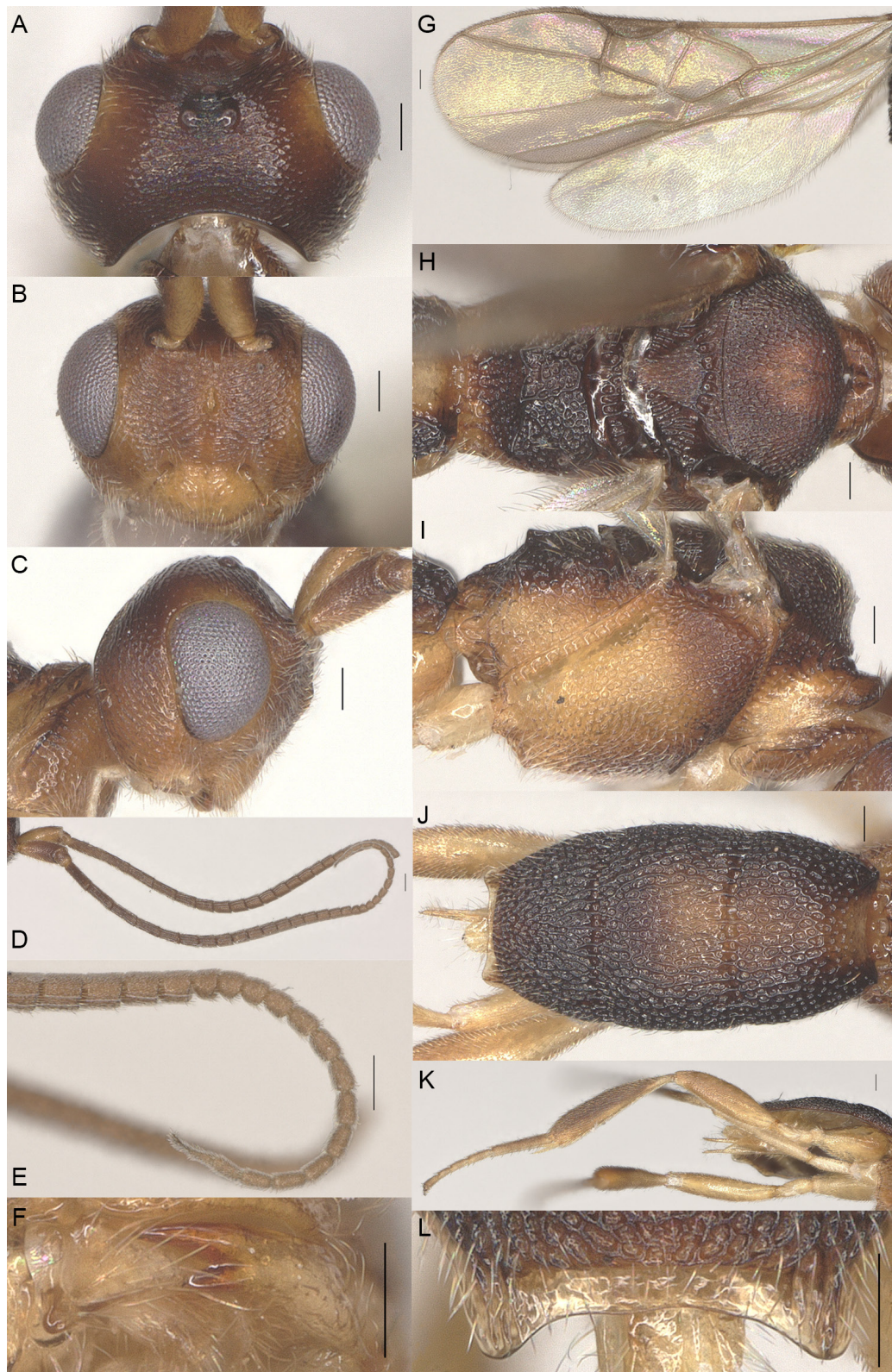


Fig. 38. *Phanerotomella fuscitibialis* sp. nov., holotype, ♀ (ZJUH No. 202307980). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Apical antenna, lateral view. **F.** Mandible, ventral view. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Hind leg. **L.** Lamella, posterior view. Scale bars: 0.1 mm.

METASOMA (Fig. 38J, L). Elliptical in dorsal view (Fig. 38J), carapace $1.9 \times$ as long as wide and $1.1 \times$ as long as mesosoma; first to third tergites densely and coarsely reticulate-rugose; third tergite $0.8 \times$ as long as second tergite, medial length of third tergite $0.5 \times$ its maximum width; lamella of third tergite wide and not protruding medio-apically and with pair of blunt tubercles latero-apically (Fig. 38L).

VARIATION. Second submarginal cell sessile or weakly petiolate, rarely vein 3-SR weakly developed; length of fore wing of female 2.4–2.6 mm; head, mesoscutum medio-anteriorly, mesopleuron, metapleuron, hind femur, first and second metasomal tergites medially and lamella of third metasomal tergite more or less darkened brown.

Male

Unknown.

Host

Unknown.

Distribution

China (Xizang).

Remarks

Phanerotomella fuscitibialis sp. nov. is similar to *P. apetila* Chen & Ji, 2003 because the apex of the metasoma is truncate in dorsal view, the temple in dorsal view narrowing behind the eye, the antenna with three subapical segments suddenly wider than long while other segments are longer than wide, and the second submarginal cell triangular. However, *P. fuscitibialis* can be distinguished from *P. apetila* by having the metasoma symmetrical and widest at the middle (metasoma narrowing to apex and widest in basal half in the latter), vein m-cu antefurcal (postfurcal in the latter), the antenna widened medially (slender in the latter), the temple rugulose and matt (smooth and shiny in the latter), and the mesopleuron reticulate (punctate in the latter).

Phanerotomella gladia Chen & Ji, 2003

Figs 39–40

Phanerotomella gladia Chen & Ji, 2003: 180, 184–185, 229, 252.

Diagnosis

Temple in dorsal view widening behind eye (Fig. 40A); mesosoma largely brownish yellow except in dorsal view lateral borders with dark brown patches (Fig. 40H); temple rugulose and matt (Fig. 40C); mesopleuron reticulate (Fig. 40I); antenna slender and apical segments non-moniliform (Fig. 40K); metasoma dark brown except first tergite and second tergite medio-basally yellow (Fig. 40J); scapus yellow (Fig. 40K); flagellum basal half brown and distal half yellowish (Fig. 40K).

Material examined (5 ♀♀, 1 ♂)

CHINA – **Zhejiang** • 1 ♀; Taishun, Wuyanling; 28 Jul.–5 Aug. 2005; J.X. Liu leg.; ZJUH No. 200609783 • 1 ♀; Taishun, Wuyanling; 1–2 Aug. 2005; S.J. Wei leg.; ZJUH No. 200605212 • 2 ♀♀; Anji, Longwang Mt.; 28 Jul. 1996; H. Wu leg.; ZJUH Nos 970383, 970399 • 1 ♂; Longquan, Fengyangshan, Datianping; 4 Aug. 2008; J.X. Liu leg.; ZJUH No. 200801194. – **Fujian** • 1 ♀; Yong'an, Tianbaoyan; 20 Jul. 2001; M.H. Pu leg.; ZJUH No. 200107123.

Host

Unknown.



Fig. 39. *Phanerotomella gladia* Chen & Ji, 2003, China, ♀ (ZJUH No. 200609783), habitus, lateral view. Scale bar: 1.0 mm.

Distribution

China (Fujian, Zhejiang).

Remarks

The holotype from Fujian (Wuyi Mt.) was not available for study. The interpretation here is based on the original description and additional Chinese specimens. There are five females and one male agreeing with the description of *P. gladia* Chen & Ji, 2003.

Phanerotomella hawaiiensis (Ashmead, 1901)

Figs 41–42

Phanerotoma hawaiiensis Ashmead, 1901: 360–361.

Phanerotoma hawaiiensis – Szépligeti 1904: 101. — Swezey 1915: 107. — Beardsley 1961: 339. — Shenefelt 1973: 917.

Phanerotomella hawaiiensis – Sigwalt 1978: 715. — Zettel 1989: 59–60. — Peck *et al.* 2008: 1447–1448. — Brajković *et al.* 2010: 473–475.

Diagnosis

Vertex in lateral view strongly angled (Fig. 42C); metasoma symmetrical and maximum width in the middle (Fig. 42K); border of metasomal carapace more curved than in related species (Fig. 42K).

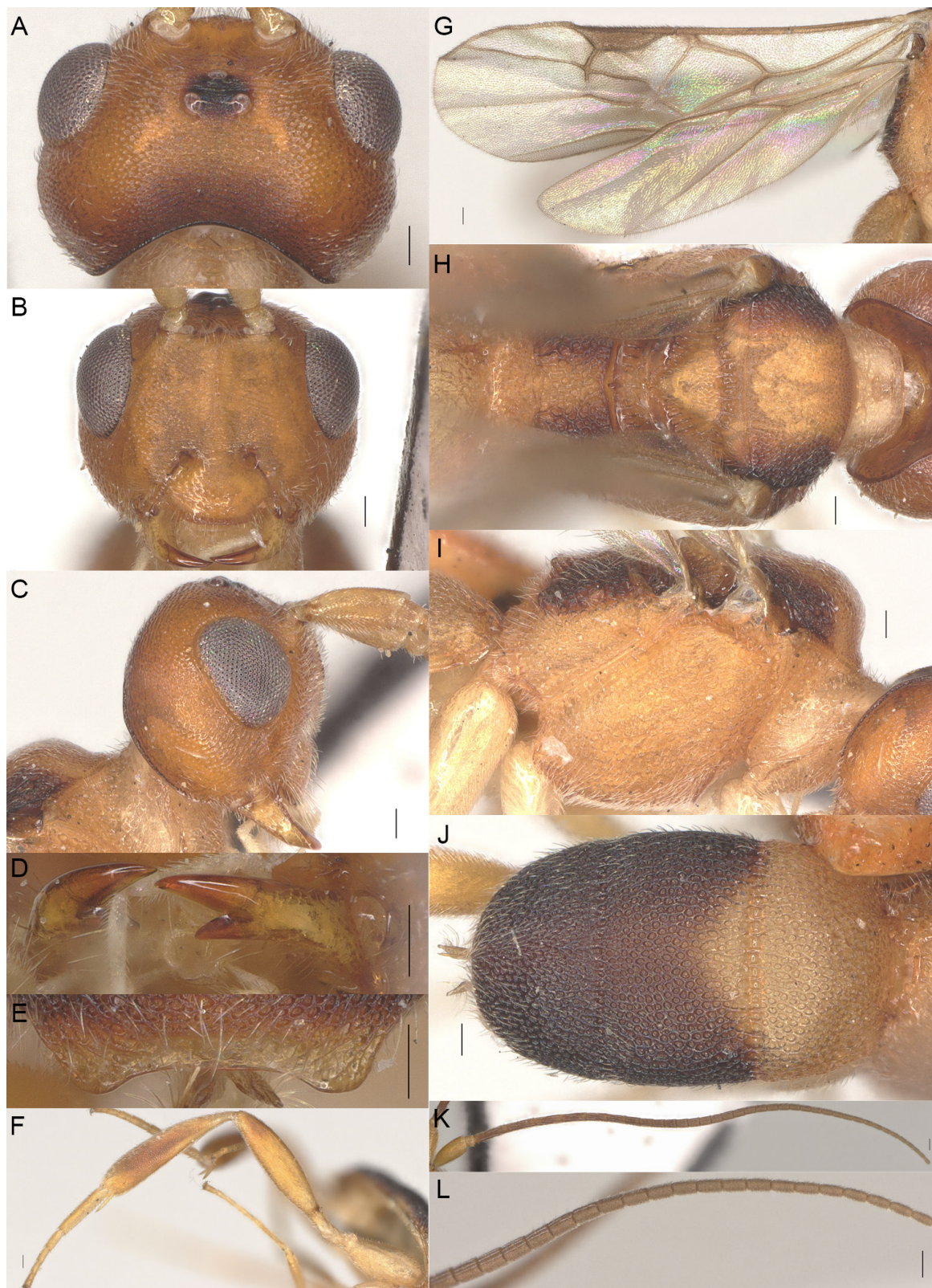


Fig. 40. *Phanerotomella gladia* Chen & Ji, 2003, China, ♀ (ZJUH No. 200609783). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

Material examined (20 ♀♀, 4 ♂♂)

CHINA – **Guangxi** • 1 ♀; Baise, Zhaojiatuo; 18 Apr. 2024; Y. Jin and R.Z. Yuan leg.; light trap; ZJUH No. 202300184. – **Guangdong** • 1 ♀; Fengkai; 18 May 1992; X.X. Chen leg.; ZJUH No. 921649 • 2 ♀♀; Fengkai, Qiancengfeng; 3 Oct. 2003; Z.F. Xu leg.; ZJUH Nos 20048077, 20048079 • 1 ♀; Fogang, Guanyin Mt.; 12 May 2004; Z.F. Xu leg.; ZJUH No. 20053319 • 1 ♀; Fogang, Guanyin Mt.; 15–16 Sep. 2007; Z.F. Xu leg.; ZJUH No. 200711503 • 1 ♀; Nanling; 9 Jul. 2005; B. Xiao leg.; ZJUH No. 200611282 • 1 ♀; Ruyuan, Nanling; 10 May 2006; J.X. Liu leg.; ZJUH No. 200800227. – **Hainan** • 1 ♀; Diaoluo Mt.; 1 Jun. 2006; J.X. Liu leg.; ZJUH No. 200702335 • 1 ♀; Shuiman, Wuzhi Mt.; 16 May 2007; J. Zeng leg.; ZJUH No. 200705108 • 2 ♀♀; Ledong, Jianfengling; 7 May 2008; J.X. Liu leg.; ZJUH Nos 200800095, 200800096. – **Jiangsu** • 1 ♀; Zhenjiang; 15 Jul. 1980; Q.X. Shen leg.; ZJUH No. 810576 • 2 ♀♀; Yangzhou; 16 Aug. 1981; L.M. Yang leg.; ZJUH Nos 820110, 820128. – **Zhejiang** • 1 ♀; Hangzhou; 15 Jun. 1957; C. Hu leg.; ZJUH No. 5778.8 • 1 ♀; Xiao Mt.; May 1975; Z.Z. Fang leg.; ZJUH No. 750250 • 1 ♀; back of West Tianmu Mt.; 3 Jul. 1998; M.S. Zhao leg.; light trap; ZJUH No. 20000152 • 1 ♀; Taishun, Wuyanling; 28 Jul.–5 Aug. 2005; J.X. Liu leg.; ZJUH No. 200609767 • 1 ♀; Taishun, Wuyanling; 1–2 Aug. 2005; S.J. Wei leg.; ZJUH No. 200605220. – **Fujian** • 1 ♂; Wuyi Mt.; 20 Jul. 1985; N.Q. Lin leg.; ZJUH No. 968151. – **Liaoning** • 3 ♂♂; Fuxin; 16–23 Jul. 1995; J.X. Lou leg.; ZJUH Nos 961301, 961305, 961349.



Fig. 41. *Phanerotomella hawaiiensis* (Ashmead, 1901), China, ♀ (ZJUH No. 200800096), habitus, lateral view. Scale bars: 1.0 mm.

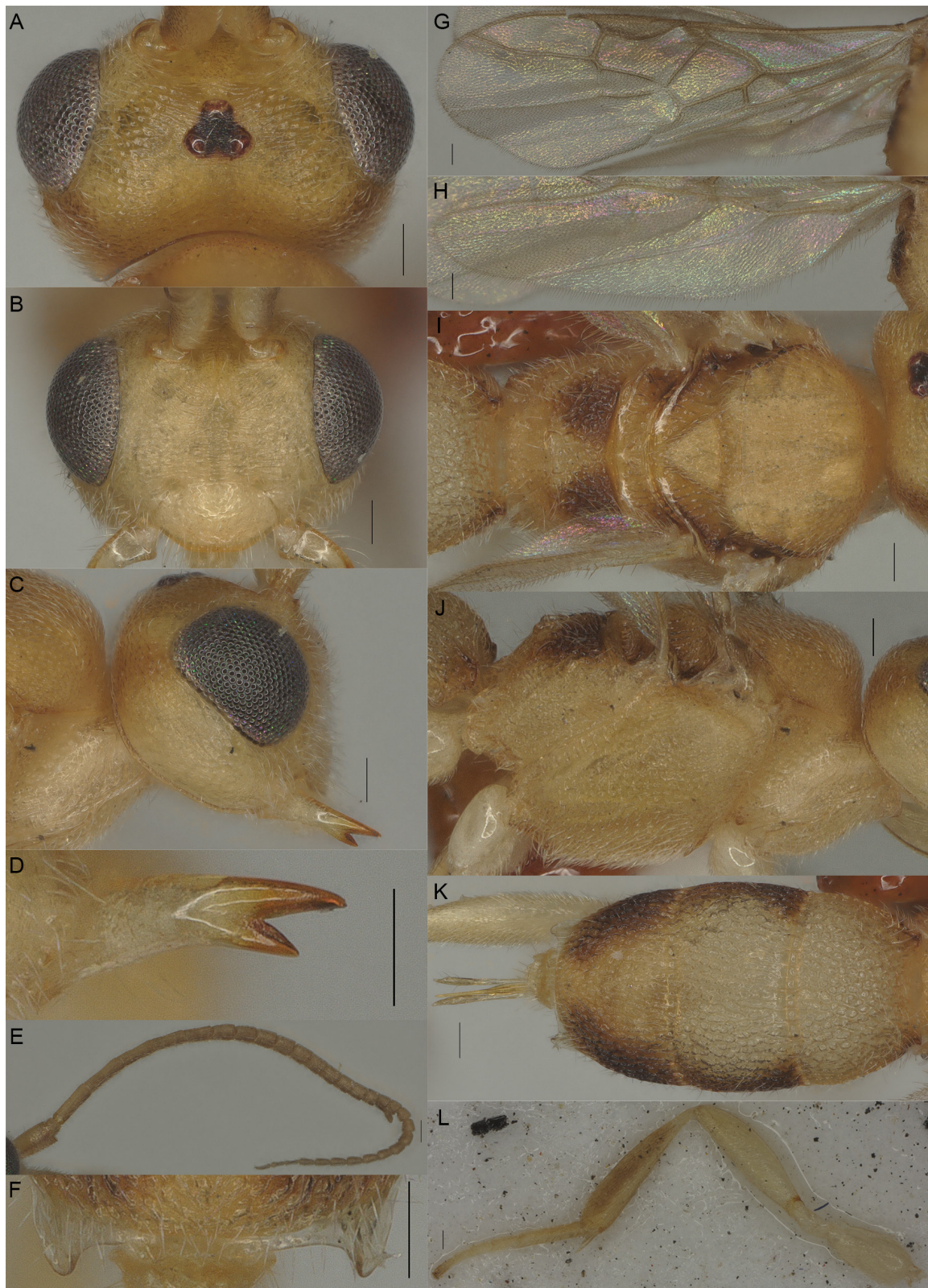


Fig. 42. *Phanerotomella hawaiiensis* (Ashmead, 1901), China, ♀ (ZJUH No. 200800096). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Antenna, lateral view. **F.** Lamella, posterior view. **G.** Fore wing. **H.** Hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Hind leg. Scale bars: 0.1 mm.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Guangxi, Hainan, Jiangsu, Liaoning, Zhejiang), United States.

Remarks

The holotype (USNM ENT00809804) is recognised from photos on the USNM website and from the redescription by Zettel (1989). There are twenty females agreeing with the description of *P. hawaiiensis* except for body length (2.5 mm vs 3.0–3.2 mm for the types) and the metasomal carapace colouration (some females yellow and with six brownish spots vs yellow except lateral border of second tergite and third tergites brown in the types). There are four males agreeing with the description of *P. hawaiiensis*.

Phanerotomella longa Ji & Chen, 2003

Figs 43–44

Phanerotomella longa Ji & Chen, 2003: 180, 189–191, 229, 254.

Diagnosis

Second submarginal cell distinctly petiolate, at least $0.5 \times$ as long as vein r (Fig. 44G); mesopleuron and mesoscutum medial-posteriorly irregularly and coarsely rugose (Fig. 44I–J); hind femur dark brown (Fig. 44F); basal half of antenna yellow and remainder brown (Fig. 44E).

Material examined (1 ♀)

CHINA – Guangdong • 1 ♀; Nanling; 16–21 Jul. 2008; Z.F. Xu leg.; ZJUH No. 200807912.

Host

Unknown.

Distribution

China (Fujian, Guangdong).

Remarks

The holotype from Fujian (Wuyi Mt.) was not available for study. Our interpretation is based on the original description and one additional Chinese specimen listed above. This female agrees with the description of *P. longa*.



Fig. 43. *Phanerotomella longa* Chen & Ji, 2003, China, ♀ (ZJUH No. 200807912), habitus, lateral view. Scale bar: 1.0 mm.

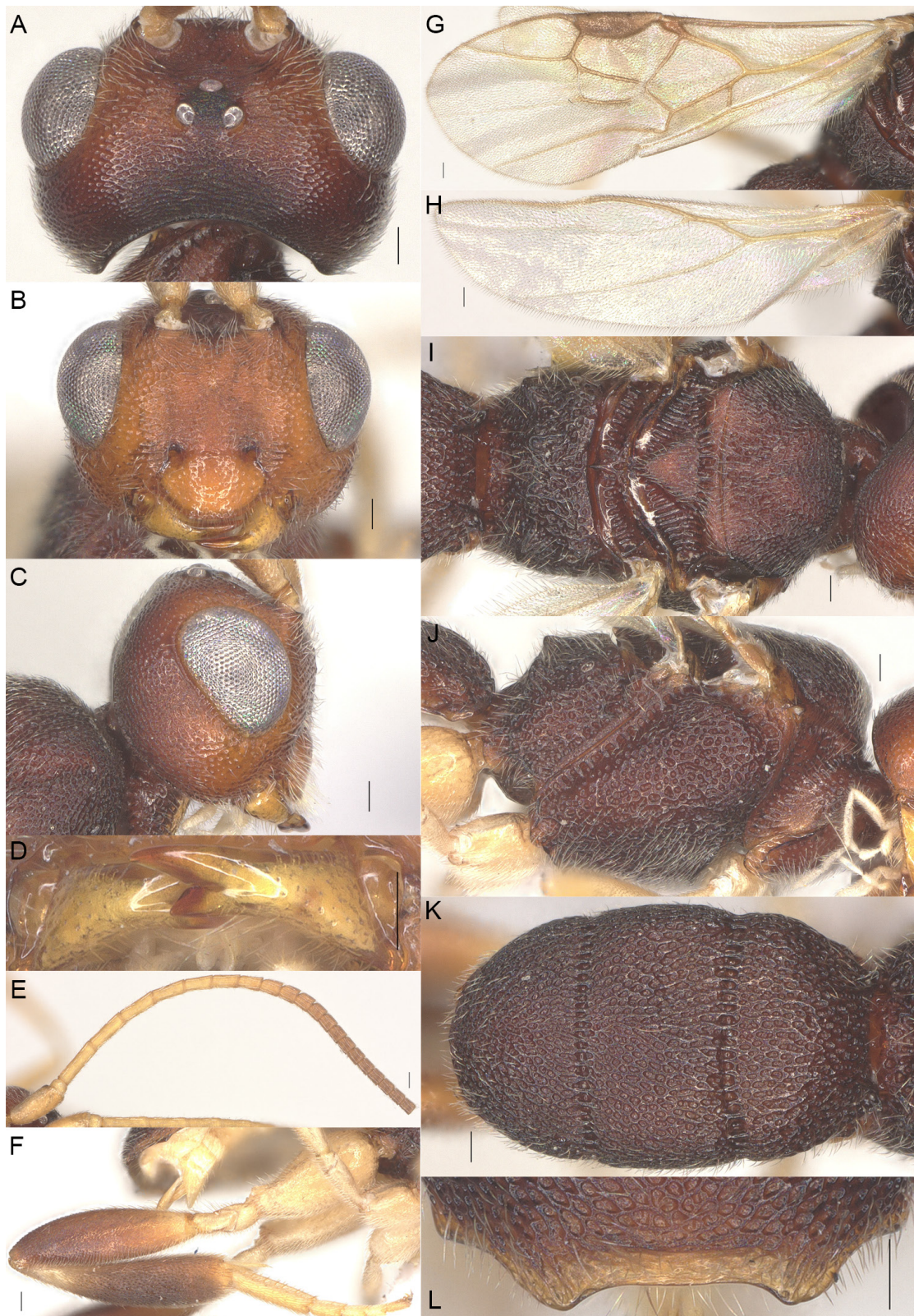


Fig. 44. *Phanerotomella longa* Chen & Ji, 2003, China, ♀ (ZJUH No. 200807912). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Antenna, lateral view. **F.** Hind leg. **G.** Fore wing. **H.** Hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Lamella, posterior view. Scale bars: 0.1 mm.

Phanerotomella mariae Belokobylskij, 1986
Figs 45–46

Phanerotomella mariae Belokobylskij, 1986: 41–44.

Phanerotomella mariae – Zettel 1989: 25, 51–52. — Papp 1989: 301; 2003b: 124. — Tobias 2000: 439–440. — Chen & Ji 2003: 180, 191–192, 229.

Diagnosis

OOL $3.8\times$ as long as OD (Fig. 46A); apex of metasoma round in dorsal view (Fig. 46J); face width $1.0\times$ height of face and clypeus together (Fig. 46B); metasoma $1.03\times$ as long as mesosoma (Fig. 45).



Fig. 45. *Phanerotomella mariae* Belokobylskij, 1986, China, ♀ (ZJUH No. 202300181), habitus, lateral view. Scale bar: 1.0 mm.

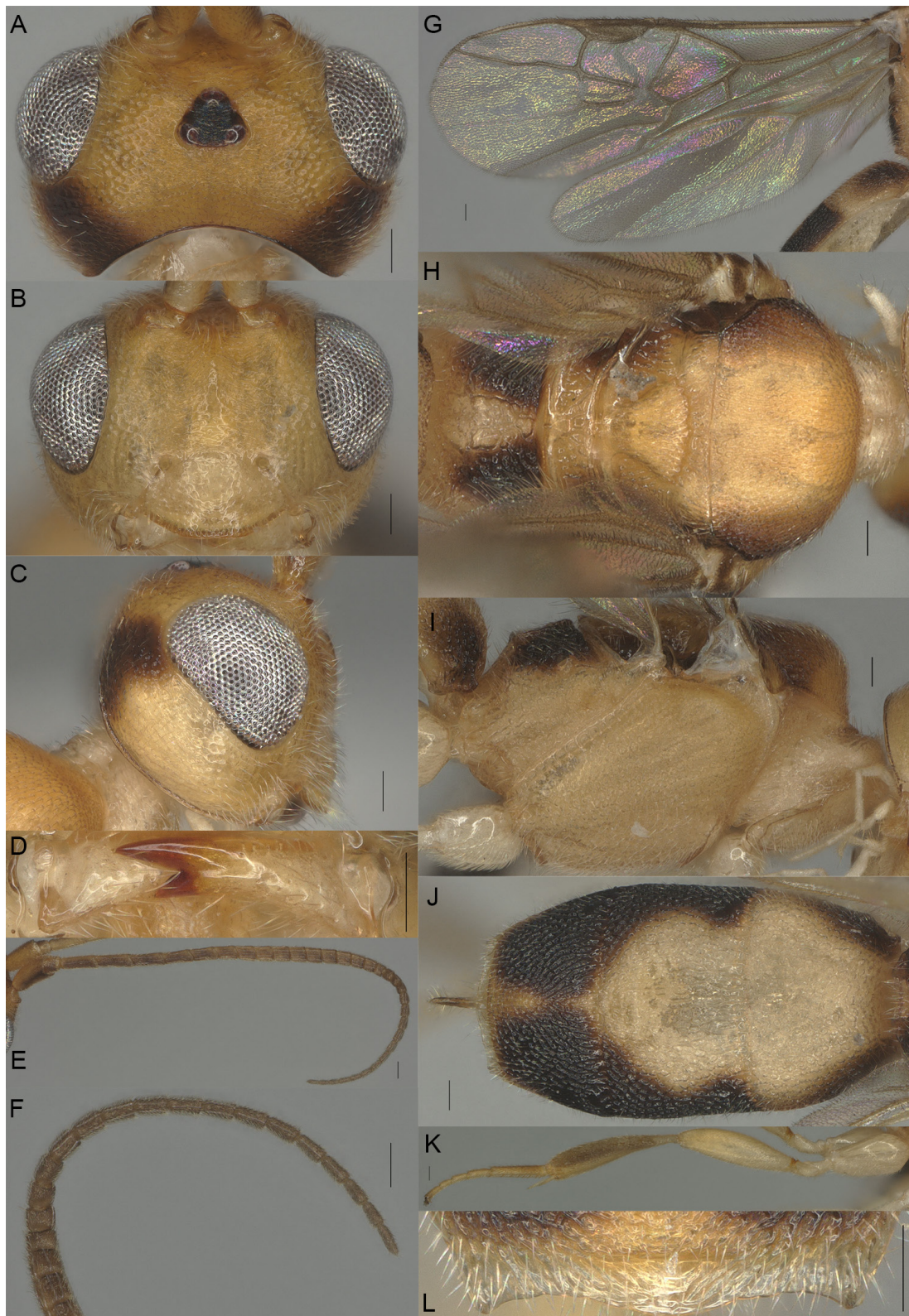


Fig. 46. *Phanerotomella mariae* Belokobylskij, 1986, China, ♀ (ZJUH No. 202300181). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Antenna, lateral view. **F.** Apical antenna, lateral view. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Hind leg. **L.** Lamella, posterior view. Scale bars: 0.1 mm.

Material examined (7 ♀♀, 19 ♂♂)

CHINA – **Zhejiang** • 1 ♀; Hangzhou; 10 Jun. 1957; C. Hu leg.; light trap; ZJUH No. 5773.7 • 2 ♂♂; Lishui; Apr.–Jun. 1982; Y. Xu leg.; ZJUH Nos 824168, 824261 • 1 ♀; same data as for preceding; ZJUH No. 824238 • 1 ♂; Ningbo, Yinxian; 1 Jul. 1980; Y.S. Li leg.; light trap; ZJUH No. 801568. – **Guangxi** • 2 ♂♂; Baise, Zhaojiatuo; 18 Apr. 2024; Y. Jin and R.Z. Yuan leg.; light trap; ZJUH Nos 202300182, 202300185 • 1 ♀; same data as for preceding; ZJUH No. 202300181 • 1 ♀; Baise, Leye, Baizhong Village; 21 Apr. 2024; R.Z. Yuan leg.; sweep net; ZJUH No. 202300191 • 2 ♂♂; Baise, Leye, Baini Village; 23 Apr. 2024; Y. Jin leg.; sweep net; ZJUH Nos 202300188, 202300190 • 1 ♀; same data as for preceding; ZJUH No. 202300189 • 1 ♀; Lingui; May 1981; Q. Wu leg.; light trap; ZJUH No. 20004252 • 1 ♀; Baise, Leye, Zhaojiatuo; 18 Apr. 2024; Y. Jin leg.; sweep net; ZJUH No. 202300187 • 1 ♂; Hechi, Fengshan County, Yuanyang River; 25 Apr. 2024; Y. Jin leg.; sweep net; ZJUH No. 202300192 • 1 ♂; Hechi, Fengshan County, Jiangzhou Yao Township, Fengping Village; 27 Apr. 2024; R.Z. Yuan leg.; sweep net; ZJUH No. 202300193. – **Hubei** • 1 ♂; Luotian, Kuanghe, Tengjia Mt.; 30°41.129' N, 115°30.400' E; elev. 152.78 m; 9 Aug. 2022; H.X. Cao leg.; sweep net; IOZ(E) No. 2059953. – **Guangdong** • 3 ♂♂; Fengkai; 18 May 1992; X.X. Chen leg.; ZJUH Nos 921669, 921690, 921716 • 1 ♂; Fengkai; 18 May 1992; Y. Ma leg.; ZJUH No. 921214 • 1 ♂; Fengkai, Qiancengfeng; 3 Oct 2003; Z.F. Xu leg.; ZJUH No. 20048080. – **Henan** • 1 ♂; Gongji Mt.; 11 Jul. 1997; X.X. Chen leg.; ZJUH No. 973743. – **Fujian** • 1 ♂; Shaowu; 6 Oct. 1979; F. Jiang leg.; ZJUH No. 880777 • 1 ♂; Shunchang; 1979; X.W. Yan leg.; ZJUH No. 801027. – **Hainan** • 1 ♂; Bawangling; 9 Jun. 2007; J.X. Liu leg.; ZJUH No. 200702355.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Guangxi, Hainan, Henan, Hubei, Zhejiang), Korea, USSR.

Remarks

The holotype was examined by Zettel (1989) and we used his redescription for the interpretation of this species, together with the original description and the additional Chinese specimens listed above. There are seven females and nineteen males agreeing with the description of *P. mariae*.

Phanerotomella mellivena van Achterberg nom. nov.

Figs 47–48

Phanerotomella flava Zettel, 1989: 23, 35–37 (not *Phanerotomella flava* Lăcătușu, 1963: 241, 243, 245).

Diagnosis

Body entirely pale yellow except for the brown flagellum (Fig. 47); pterostigma, parastigma and veins of fore wing yellow (Fig. 48H); face largely smooth except for fine punctation and less contrasting than smooth clypeus (Fig. 48B); mesopleuron densely and superficially punctate (Fig. 48J); stemmaticum distinctly narrowed, OD 1.3–1.4× as long as POL and ocelli arranged in a triangle with base 0.9× as long as its sides (Fig. 48A); basal carina of first metasomal tergite distinctly developed (Fig. 48K); metasoma regularly reticulate except the first tergite longitudinally striate medially (Fig. 48K).

Etymology

Renamed after the yellow (honey-coloured) veins of the fore wing; ‘*mellis*’ is Latin for ‘honey’ and ‘*vena*’ is Latin for ‘vein’.

Material examined (3 ♀♀)

CHINA – Hainan • 1 ♀; Jianfengling, Tianchi; 12–15 Jul. 2006; W.Y. Zhang leg.; ZJUH No. 200803502 • 1 ♀; Jianfengling, Tianchi; 12–15 Jul. 2006; J.X. Liu leg.; ZJUH No. 200803614 • 1 ♀; Jianfengling; 7 Jun. 2007; J.X. Liu leg.; ZJUH No. 202300197.

Host

Unknown.

Distribution

Brunei, China (Hainan), Malaysia, Philippines, Singapore.

Remarks

Phanerotomella flava Zettel, 1989 is a junior homonym of *P. flava* Lăcătușu, 1963 (the latter is a new synonym of *P. rufa* (Marshall, 1898) syn. nov.).

The holotype (USNMENT 01932230) from East Malaysia (Sandakan) was not examined; the interpretation is based on the original description by Zettel (1989) and photos of the holotype on the USNM website. There are three females agreeing with the original description of *P. flava* Zettel, 1989 (= *P. mellivena* van Achterberg nom. nov.).



Fig. 47. *Phanerotomella mellivena* van Achterberg nom. nov., China, ♀ (ZJUH No. 200803502), habitus, lateral view. Scale bar: 1.0 mm.

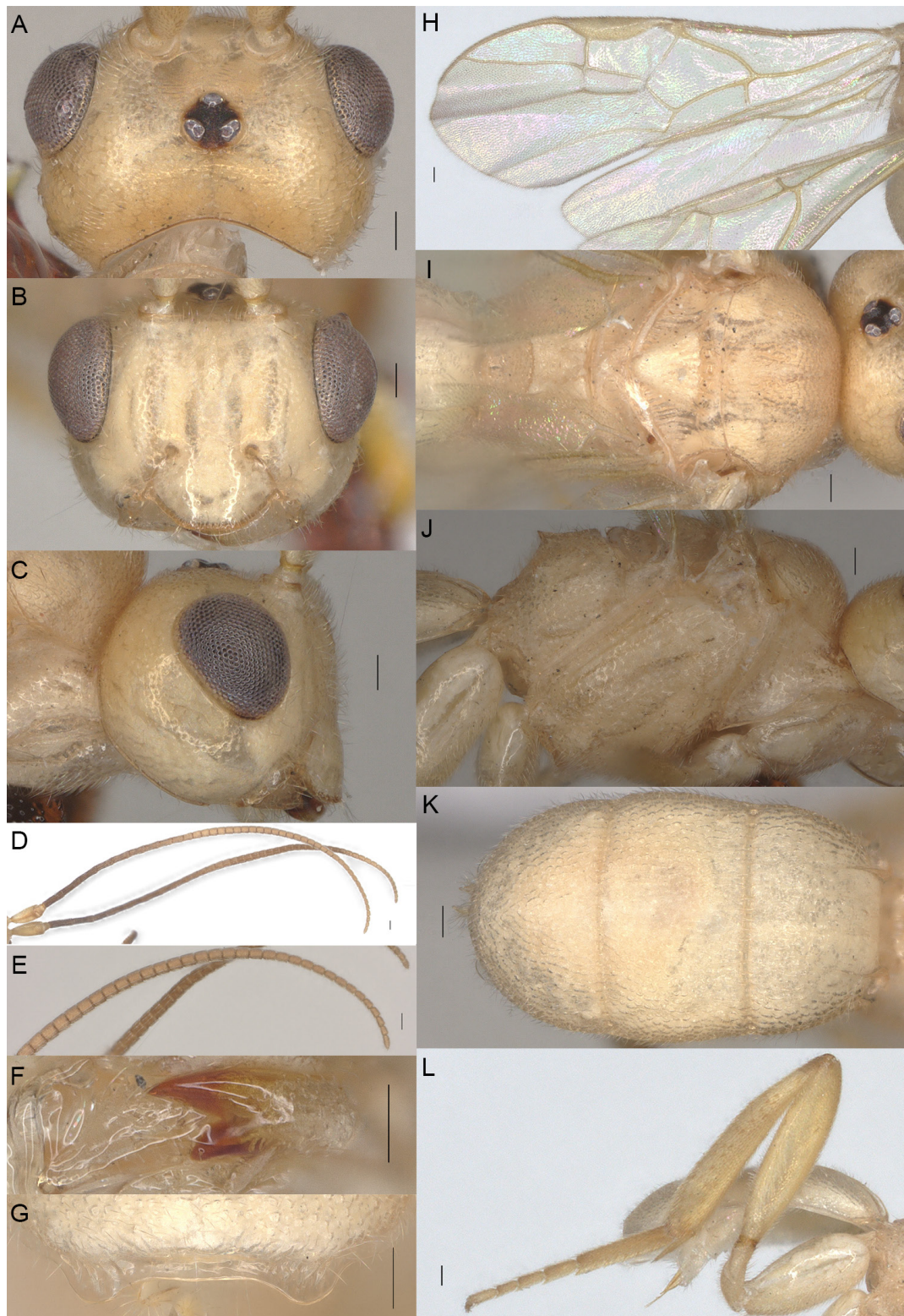


Fig. 48. *Phanerotomella mellivena* van Achterberg nom. nov., China, ♀ (ZJUH No. 200803502). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Apical antenna, lateral view. **F.** Mandible, ventral view. **G.** Lamella, posterior view. **H.** Fore and hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Hind leg. Scale bars: 0.1 mm.

Phanerotomella nigricaner Chen & Ji, 2003

Phanerotomella nigricaner Chen & Ji, 2003: 181, 192–193, 230, 254.

Diagnosis

Eye in dorsal view 1.2–1.3 × as long as temple; mesopleuron honeycomb-like sculptured but without smooth and shiny area posteriorly; 21st–28th segments of antenna longer than wide; first metasomal tergite finely honeycomb-like sculptured.

Host

Unknown.

Distribution

China (Fujian).

Remarks

Unfortunately, the female holotype from China (Fujian, Wuyi Mt.) could not be examined and no additional material is available. The interpretation of this species is based on the original description.

Phanerotomella nigrisoma sp. nov.

[urn:lsid:zoobank.org:act:29B385E5-2C78-408C-9144-BEE68771CC89](https://doi.org/10.2307/29B385E5-2C78-408C-9144-BEE68771CC89)

Figs 49–50

Diagnosis

Body small, length about 2.7 mm (Fig. 49); mesopleuron densely and finely reticulate and with distinctly smooth and shiny area posteriorly (Fig. 50I); hind tibia dark brown but basally white and contrasting with yellowish brown hind femur (Fig. 50F); hind coxa ivory (Fig. 50F); face and temple rugulose (Fig. 50B–C).

Etymology

Named after its black mesosoma; ‘*niger*’ is Latin for ‘black’ and ‘*soma*’ is Greek for ‘body’.

Type material

Holotype

CHINA – Yunnan • ♀; Bazhai, Yudong Reservoir; Jun. 2017; Z. Liu leg.; ZJUH No. 202307931.

Paratypes (3 ♀♀)

CHINA – Yunnan • 3 ♀♀; Puer, Laiyang River National Forest Park; 12 Sep. 2013; J. Zeng leg.; ZJUH Nos 202026436, 202026448, 202026498.

Description

Female

MEASUREMENTS. Length of body 2.7 mm, fore wing 2.5 mm.

COLOURATION. Black; metasoma ventrally white or ivory; antenna dark brown except 3rd–6th segments white and scapus anteriorly yellow; mandible yellowish and with reddish teeth; fore and middle legs yellow except coxa and trochanter white; hind femur brownish yellow, hind tibia dark brown but basally whitish, hind coxa, trochanter and first to fourth tarsal segments white but telotarsus brown; wing veins dark brown to pale brown, pterostigma and parastigma dark brown.

HEAD (Fig. 50A–C). Width $1.3 \times$ median length in anterior view (Fig. 50B) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 50C); antenna with 26+ segments, widened and shortened medially, gradually narrowing apically, subapical segments non-moniliform and longer than wide, third, fourth, tenth and fifteenth segments 3.5 , 3.3 , 1.7 and $1.1 \times$ as long as wide in lateral view, respectively (Fig. 50K); area of stemmaticum transversely striate; OOL:OD:POL=18:5:5; length of eye $1.0 \times$ temple in dorsal view (Fig. 50A); frons transversely rugulose and with median carina; vertex reticulate-rugulose with short setae; temple superficially rugulose; face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus smooth, truncate medio-ventrally; eye width in lateral view as wide as maximum width of temple (Fig. 50C), eye height in anterior view $0.7 \times$ minimum width of face (Fig. 50B); malar space rugulose and $1.1 \times$ as long as basal width of mandible; mandible somewhat slender, lower tooth of mandible $0.5 \times$ as long as apical tooth (Fig. 50D); face width equal to height of face and clypeus together.

MESOSOMA (Fig. 50H–I). Length $1.6 \times$ its width in lateral view (Fig. 50I); side of pronotum superficially rugulose-punctate; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with six crenulae (Fig. 50H); scutellum reticulate and matt; mesopleuron regularly and densely reticulate and with distinctly smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt tubercles laterally.



Fig. 49. *Phanerotomella nigrisoma* sp. nov., holotype, ♀ (ZJUH No. 202307931), habitus, lateral view. Scale bar: 1.0 mm.

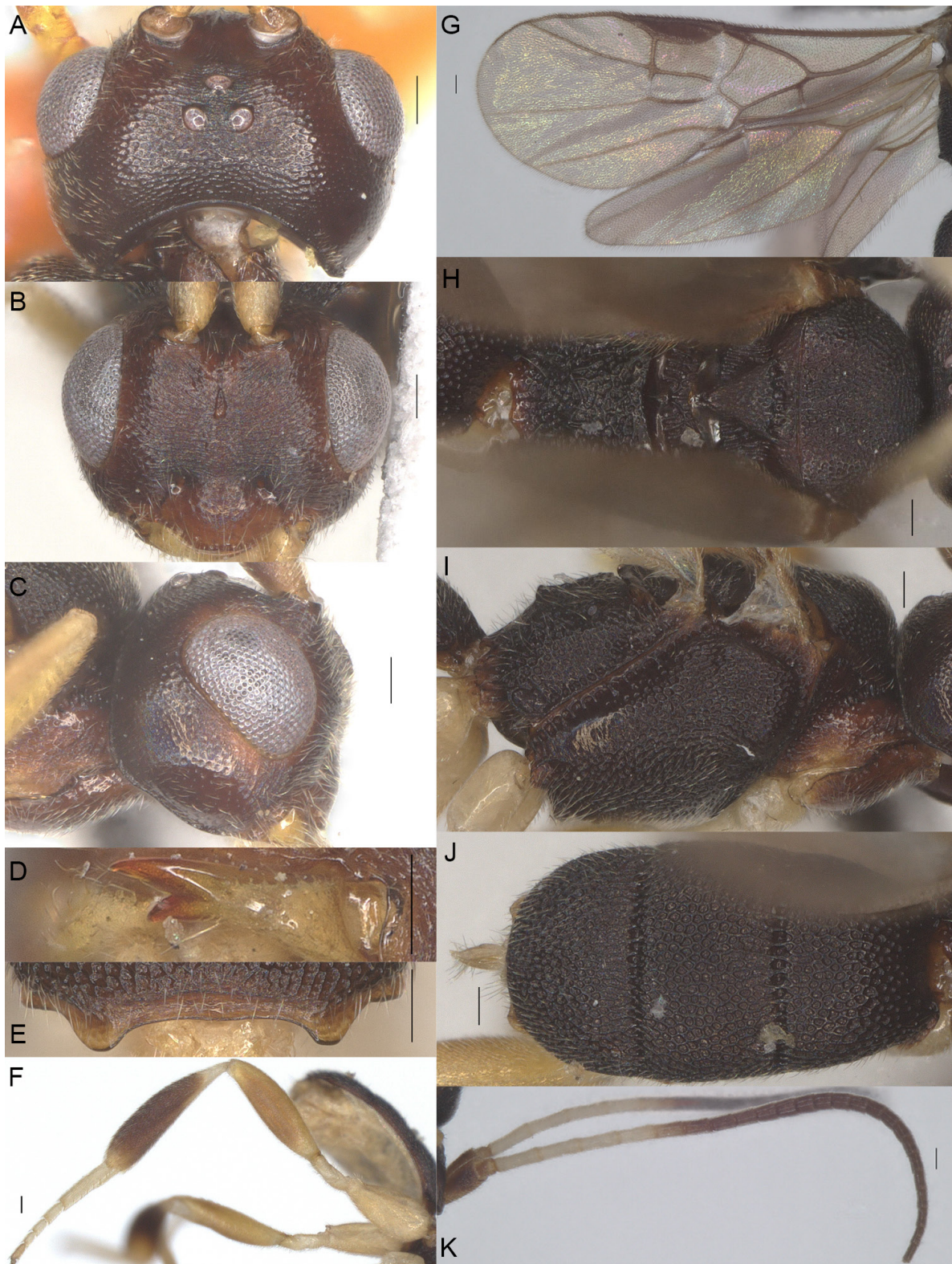


Fig. 50. *Phanerotomella nigrisoma* sp. nov. **A.** Paratype, ♀ (ZJUH No. 202026498). **B–K.** Holotype, ♀ (ZJUH No. 202307931). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. Scale bars: 0.1 mm.

WINGS (Fig. 50G). Fore wing $2.6\times$ as long as its maximum width; second submarginal cell weakly petiolate or sessile; vein m-cu distinctly postfurcal; veins r and SR1 straight; vein 1-SR+M curved; length of 1-R1 as long as pterostigma; vein r issued far beyond middle of pterostigma, $1.1\times$ vein r-m; r:2-SR:SR1=13:30:69; vein 1-CU1 $0.3\times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=23:29:12.

LEGS (Fig. 50F). Hind femur $3.6\times$ as long as wide; longest spur of hind tibia $0.5\times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

METASOMA (Fig. 50E, J). Oval in dorsal view (Fig. 50J), carapace $1.8\times$ as long as wide and as long as mesosoma; first to third tergites densely reticulate-rugose; third tergite $0.9\times$ as long as second tergite, medial length of third tergite $0.5\times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of small and blunt tubercles latero-apically (Fig. 50E).

VARIATION. Second submarginal cell weakly petiolate or sessile; length of fore wing of female 2.5–2.8 mm.

Male

Unknown.

Host

Unknown.

Distribution

China (Yunnan).

Remarks

Phanerotomella nigrisoma sp. nov. is similar to *P. taiwanensis* because it has the antenna with a white basal band of the flagellum, the eye in dorsal view $0.9\text{--}1.0\times$ as long as the temple, and the antenna with non-moniliform subapical segments. However, *P. nigrisoma* can be distinguished from *P. taiwanensis* by having the antenna widened medially (slender in the latter), the body length about 3.0 mm (4.0 mm in the latter), the face and temple rugulose and matt (punctate and shiny in the latter), the mesopleuron reticulate and with a smooth, shiny area posteriorly (punctate and without a smooth area in the latter), the hind femur yellowish brown and the hind tibia dark brown (black in the latter).

Phanerotomella pallidistigma Chen & Ji, 2003 Figs 51–52

Phanerotomella pallidistigma Chen & Ji, 2003: 180, 193–194, 229, 254.

Diagnosis

Parastigma white (Fig. 52G); antenna of female strongly widened medially and with 11–13 subapical segments moniliform (Fig. 52K–L); mandible slender and lower tooth of mandible strongly reduced, $0.2\text{--}0.3\times$ apical tooth (Fig. 52D); mesopleuron punctate-reticulate and with distinctly smooth and shiny area posteriorly (Fig. 52I); temple superficially rugulose and shiny (Fig. 52C); scapus and pedicellus yellow and contrasting with dark brown flagellum (Fig. 52K); second submarginal cell petiolate (Fig. 52G).

Material examined (32 ♀♀)

CHINA – **Fujian** • 1 ♀; Xianfengling; 26 Jun. 1980; J.H. Chen leg.; ZJUH No. 202300198. – **Guizhou** • 1 ♀; Fanjing Mt., Huixiangping; 11 Jul. 1993; Z.F. Xu leg.; ZJUH No. 935742. – **Zhejiang** • 1 ♀; West Tianmu Mt., Qiliting; 9 Aug. 1999; M.S. Zhao leg.; Malaise trap; ZJUH No. 998934 • 1 ♀; Baishanzu;

15 Aug. 2003; J.X. Liu leg.; ZJUH No. 20045232 • 1 ♀; Linan, Qingliangfeng; 9 Aug. 2005; H.Y. Zhang leg.; ZJUH No. 200603291 • 1 ♀; Linan, Qingliangfeng; 9 Aug. 2005; M. Shi leg.; ZJUH No. 200603610 • 1 ♀; Linan, Qingliangfeng; 12 Aug. 2005; H.Y. Zhang leg.; ZJUH No. 200603507 • 1 ♀; Tianmu Mt., Xianrending; 25 Jul. 2011; Z. Liu leg.; ZJUH No. 201101839. – **Yunnan** • 2 ♀♀; Pingbian; 18 Jul. 2003; Z.F. Xu leg.; ZJUH Nos 20045203, 20045208 • 1 ♀; Pingbian, Dawei Mt. Reserve; elev. 1970–2107 m; 18 Jul. 2003; J. Lu leg.; ZJUH No. 20045414. – **Xizang** • 1 ♀; Linzhi, Yigong, Baihequ; 4 Aug. 2019; C.H. Wang leg.; ZJUH No. 202307936 • 1 ♀; Linzhi, Yigong, Tongjia Village; 6 Aug. 2019; C.H. Wang leg.; ZJUH No. 202307982 • 1 ♀; Linzhi, Bomi, Gang Village; 7 Aug. 2019; yellow pan trap; ZJUH No. 202307981 • 2 ♀♀; Linzhi, Bomi, Gang Village; 9 Aug. 2019; X.F. Li leg.; ZJUH Nos 202307521, 202307613 • 1 ♀; Linzhi, Bomi, Gang Village; 9 Aug. 2019; P. Tang leg.; ZJUH No. 202307568 • 5 ♀♀; Linzhi, Bomi, Gang Village; 9 Aug. 2019; X.Z. Ma leg.; ZJUH Nos 202307610, 202307656, 202307748, 202307840, 202307886 • 9 ♀♀; Linzhi, Bomi, Gang Village; 9 Aug. 2019; C.H. Wang leg.; ZJUH Nos 202307795, 202307841, 202307932, 202307565, 202307887, 202307933, 202307749, 202307504, 202307978. – **Hainan** • 1 ♀; Jianfengling; 12–15 Jul. 2006; Jingxian Liu leg.; ZJUH No. 200610622.

Host

Unknown.



Fig. 51. *Phanerotomella pallidistigma* Chen & Ji, 2003, China, ♀ (ZJUH No. 201101839), habitus, lateral view. Scale bar: 1.0 mm.

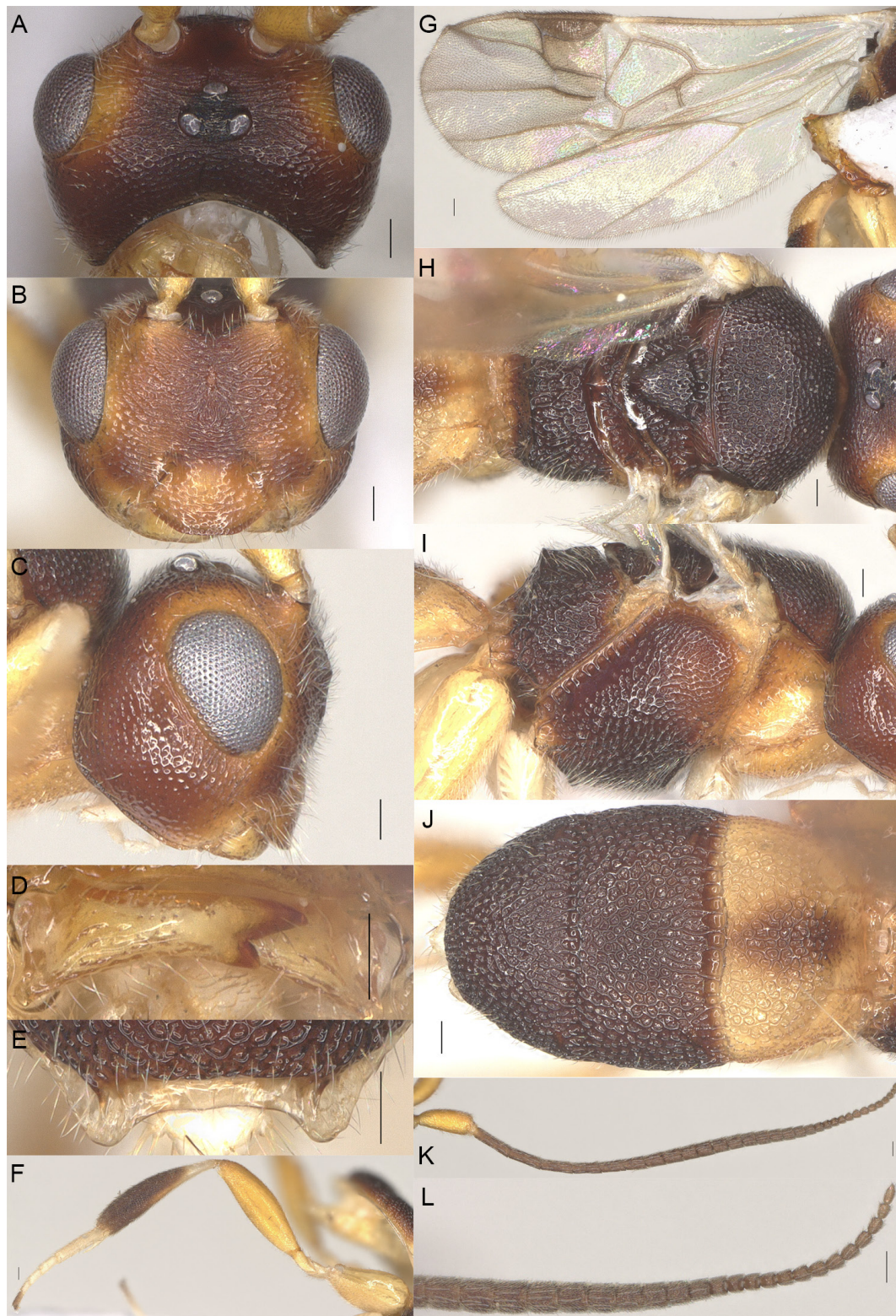


Fig. 52. *Phanerotomella pallidistigma* Chen & Ji, 2003, China, ♀ (ZJUH No. 201101839). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

Distribution

China (Fujian, Guizhou, Hainan, Xizang, Yunnan, Zhejiang).

Remarks

The holotype from China (Fujian, Wuyi Mt.) was not available for study. Our interpretation is based on the original description and the additional Chinese specimens listed above. There are thirty-two females, which largely agree with the description of *P. pallidistigma* except for the colouration (lightened to yellow or darkened to black). However, the Xizang population shows a distinct and stable variation, such as a black body, a distinctly narrowed temple and a strongly curved border of the metasomal carapace; it might represent a new species.

Phanerotomella palliscapus Chen & Ji, 2003
Figs 53–54

Phanerotomella palliscapus Chen & Ji, 2003: 181, 194–195, 231, 255.

Diagnosis

Hind coxa pale yellow except brown apically (Fig. 54F); vein r $1.7\times$ as long as vein r-m (Fig. 54G); hind femur slender, $4.5\times$ as long as wide (Fig. 54F); scapus and pedicellus white and strongly contrasting with dark brown flagellum (Fig. 54K); hind femur black and hind tibia black but basally white (Fig. 54F);

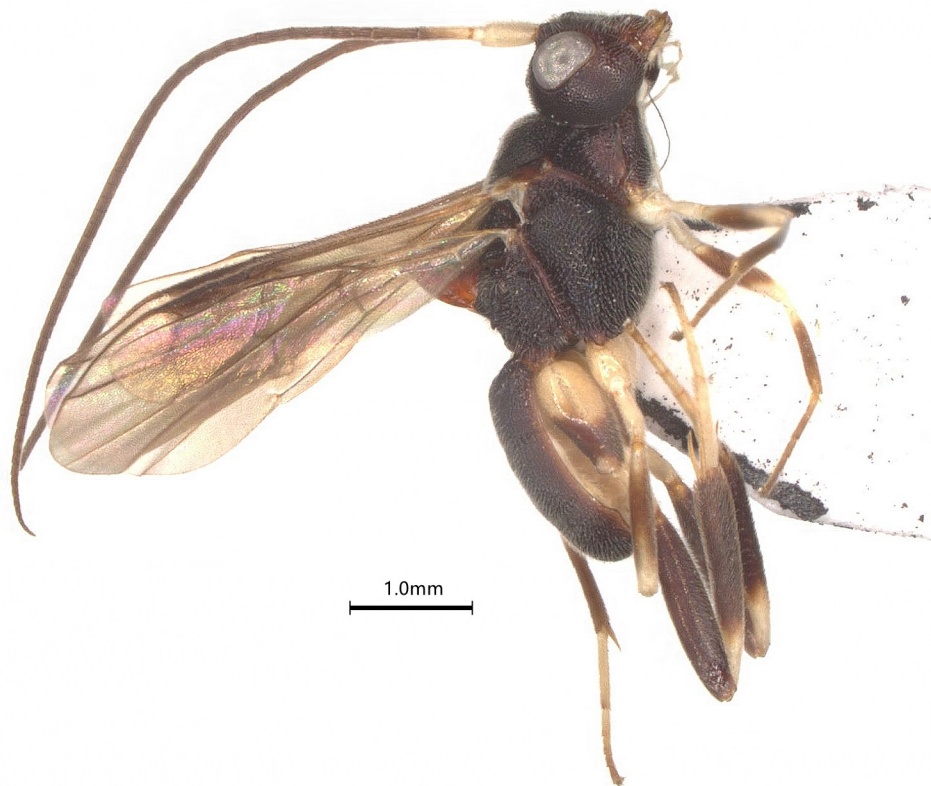


Fig. 53. *Phanerotomella palliscapus* Chen & Ji, 2003, China, ♀ (ZJUH No. 200604025), habitus, lateral view. Scale bar: 1.0 mm.



Fig. 54. *Phanerotomella palliscapus* Chen & Ji, 2003, China. **A.** ♀ (ZJUH No. 200605037). **B–L.** ♀ (ZJUH No. 200604025). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

hind trochanter and tarsus white (Fig. 54F); mesopleuron densely and regularly reticulate (Fig. 54I); face rugulose (Fig. 54B) but temple densely punctate (Fig. 54C); scutellum largely reticulate except posteriorly punctate (Fig. 54H); temple in dorsal view somewhat widened behind eye (Fig. 54A).

Material examined (19 ♀♀, 26 ♂♂)

CHINA – **Fujian** • 1 ♀; Tongmu; 11 Jul. 1982; J.C. Huang leg.; ZJUH No. 923197 • 1 ♀; Xiaguadang; 29 Jul. 1982; Z.F. Xu leg.; ZJUH No. 20004213 • 1 ♀; Chongan, Guadang; 5 Jul. 1985; J.Z. Zhao leg.; ZJUH No. 923196 • 1 ♀; Meihua Mt., Guihe to Baigongao; elev. 1100–1400 m; 23–24 Jul. 1988; J.H. He leg.; ZJUH No. 887415 • 1 ♀; Meihua Mt., Guihe to Baigongao; elev. 1100–1400 m; 23–24 Jul. 1988; L.J. Fan leg.; ZJUH No. 886456 • 1 ♀; Yongan, Tianbaoyan; 15–18 Jul. 2001; Z.F. Xu leg.; ZJUH No. 20020081 • 1 ♂; Xianfengling; 30 Jun. 1980; Z.Y. Xu leg.; ZJUH No. 923195 • 2 ♂♂; Wuyi Mt.; 5 Jul. 1986; J.S. Wang leg.; ZJUH Nos 865599, 870661 • 1 ♂; Jiangle, Longqi Mt.; 8 Jul. 1991; C.M. Liu leg.; ZJUH No. 969696. – **Yunnan** • 1 ♀; Xishuangbanna; 21°44.944' N, 100°26.182' E; elev. 1621 m; 20 Jun.–21 Jul. 2018; Malaise trap; ZJUH No. 20180082 • 1 ♀; Xishuangbanna; 17 May–21 Jun. 2018; Malaise trap; ZJUH No. 201805222 • 1 ♂; Kunming; 24 Mar. 1981; J.K. Yang leg.; ZJUH No. 200012401. – **Zhejiang** • 1 ♀; Qingyuan; 26–27 Jul. 1985; Q.C. Wu leg.; ZJUH No. 851883 • 1 ♀; Songyang; 28 Aug. 1989; Y.F. Chen leg.; ZJUH No. 896813 • 1 ♀; Kaihua, Gutian Mt.; 1 Jul. 2005; M. Shi leg.; ZJUH No. 200601726 • 1 ♂; Kaihua, Gutian Mt.; 1 Jul. 2005; Q. Wu leg.; ZJUH No. 200601933 • 1 ♀; same data as for preceding; ZJUH No. 200601932 • 2 ♂♂; Kaihua, Gutian Mt.; 2 Jul. 2005; X.X. Chen leg.; ZJUH Nos 200601572, 200601600 • 1 ♀; same data as for preceding; ZJUH No. 200601598 • 2 ♂♂; Kaihua, Gutian Mt.; 3 Jul. 2005; M. Shi leg.; ZJUH Nos 200601923, 200601927 • 1 ♀; same data as for preceding; ZJUH No. 200601917 • 3 ♂♂; Kaihua, Gutian Mt.; 3 Jul. 2005; Q. Wu leg.; ZJUH Nos 200602089, 200602100, 200602137 • 2 ♀♀; same data as for preceding; ZJUH Nos 200602085, 200604025 • 5 ♂♂; Kaihua, Gutian Mt.; 3 Jul. 2005; H.Y. Zhang leg.; ZJUH Nos 200602200, 200602203, 200602207, 200602226, 200602239 • 2 ♀♀; same data as for preceding; ZJUH Nos 200602199, 200602227 • 1 ♀; Taishun, Wuyanling; 29 Jul. 2005; P. Xu leg.; ZJUH No. 200605037 • 5 ♂♂; Kaihua, Gutian Mt.; 2 Jul. 2005; Q. Wu leg.; ZJUH Nos 200601969, 200601971, 200601980, 200601985, 200601995 • 1 ♂; Kaihua, Gutian Mt.; Jul. to Aug. 1990; Z.H. Guan leg.; ZJUH No. 905554 • 1 ♂; Kaihua, Gutian Mt.; 18 Jul. 1992; Y. Ma leg.; ZJUH No. 923175 • 1 ♂; Songyang; 1–6 Aug. 1989; J.H. He leg.; ZJUH No. 895448.

Host

Unknown.

Distribution

China (Fujian, Yunnan, Zhejiang).

Remarks

The holotype from China (Fujian, Wuyi Mt.) is not available for study and the interpretation here is based on the original description and the additional Chinese specimens listed above. There are nineteen females agreeing with the description of *P. palliscapus* except for the body length (3.8–4.9 mm vs 4.4–5.5 mm for the types). In addition, there are twenty-six males agreeing with the description of *P. palliscapus*.

Phanerotomella pulchra Fahringer, 1934

Phanerotomella pulchra Fahringer, 1934: 583–585.

Phanerotomella variareolata Belokobylskij, 1986: 41–42, 44–46. **Syn. nov.**

Phanerotomella pulchra – Fahringer 1938: 3–4. — Telenga 1941: 434. — Shenefelt 1973: 931. — Ma 1983: 640. — Zettel 1989: 25, 50–51. — Papp 1989: 301. — Tobias 2000: 439–440. — He *et al.* 2001: 47–48, 50. — Chen & Ji 2003: 180, 197, 230.

Phanerotomella variareolata – Zettel 1989: 25, 52–53. — Papp 1989: 301. — Tobias 2000: 439, 441. — Chen & Ji 2003: 180, 204–205, 230.

Diagnosis

OOL $3.2 \times$ as long as OD; apex of metasomal carapace pointed in dorsal view; face width $0.95 \times$ height of face and clypeus together; metasoma $0.93 \times$ as long as mesosoma.

Host

Unknown.

Distribution

Russia, China (Fujian, Jiangsu, Yunnan).

Remarks

The holotype of *P. pulchra* from China (Jiangsu; ♂) and *P. variareolata* from Russia (♀) were examined by Zettel (1989) and the interpretation here is based on his redescription and the original descriptions. The differences between both types are considered to be intraspecific.

Phanerotomella variareolata is treated as a junior synonym of *P. pulchra* based on the following key characters: (1) face width $0.95 \times$ height of face and clypeus together; (2) metasoma $0.92\text{--}0.93 \times$ as long as mesosoma; (3) eye in dorsal view $0.9 \times$ as long as temple; (4) malar space $0.42\text{--}0.43 \times$ as long as eye; (5) metasomal carapace $1.85 \times$ as long as maximum width.

Phanerotomella rhytisma Chen & Ji, 2003

Figs 55–56

Phanerotomella rhytisma Chen & Ji, 2003: 180, 197–199, 230, 255–256.

Diagnosis

Face, temple and mesopleuron distinctly punctate (Fig. 56B–C, I); clypeus yellow and distinctly contrasting with black face (Fig. 56B); mandible rather robust (Fig. 56D); lamella of third metasomal tergite posteriorly with pair of very small and blunt tubercles and weakly contrasting with lamella (Fig. 56E); first metasomal tergite with at least a black semi-circular spot medio-basally (Fig. 56J); face black with two yellow elongate spots (Fig. 56B); scapus yellow and contrasting with brown flagellum (Fig. 56K); hind femur yellow except for distal small black spot (Fig. 56F).

Material examined (18 ♀♀)

CHINA – **Zhejiang** • 1 ♀; Taishun, Wuyanling; 3 Aug. 2005; P. Xu leg.; ZJUH No. 200605246 • 1 ♀; Taishun, Wuyanling; Nov. 2005; Y.P. Wang leg.; Malaise trap; ZJUH No. 200800223 • 1 ♀; Wuyanling Natural Reserve; elev. 800 m; Nov. 2005; Y.P. Wang leg.; ZJUH No. 202300196 • 1 ♀; Tianmu Mt.; 21 Jul. 1987; X.M. Lou leg.; ZJUH No. 874516 • 1 ♀; West Tianmu Mt., Xianrending; 18 Aug. 1999; Y. Ma leg.; ZJUH No. 997486 • 1 ♀; Tianmu Mt., Xianrending; 27 Jul. 2011; Y. Ma leg.; ZJUH No. 201101467 • 1 ♀; Tianmu Mt., Qianmutian to Bingchuangdashigu; 29 Jul. 2011; S.N. Song leg.; ZJUH No. 201101701. – **Guizhou** • 2 ♀♀; Fanjing Mt., Huixiangping; 11 Jul. 1993; S.L. Yao leg.; ZJUH Nos 937284, 937288 • 1 ♀; Fanjing Mt., Huixiangping; 12 Jul. 1993; Z.F. Xu leg.; ZJUH No. 936007.

– **Shaanxi** • 1 ♀; Huayang, Yangxian, Changqing Natural Reserve; 33°36.600' N, 107°23.400' E; elev. 1048 m; 18 Jul.–20 Aug. 2015; L.P. Zhao leg. – **Fujian** • 2 ♀♀; Meihua Mt., Guihe to Baigongao; elev. 1100–1400 m; 23–24 Jul. 1988; J.H. He leg.; ZJUH Nos 887409, 887412 • 2 ♀♀; Meihua Mt., Guihe to Baigongao; elev. 1100–1400 m; 23–24 Jul. 1988; L.J. Fang leg.; ZJUH Nos 886381, 886455. – **Guangxi** • 2 ♀♀; Daming Mt.; 6 Aug. 2011; C.J. Yan leg.; ZJUH Nos 201100790, 201100807. – **Guangdong** • 1 ♀; Fuyuan, Nanling; 4 Aug. 2004; Z.F. Xu leg.; ZJUH No. 20049882.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Guangxi, Guizhou, Shaanxi, Zhejiang).

Remarks

The holotype from China (Fujian, Wuyi Mt.) is not available for study and the interpretation here is based on the original description and the additional Chinese specimens listed above. There are eighteen females agreeing with the description of *P. rhytisma* except for the body length (4.0–4.6 mm vs 4.2 and 4.6 mm for the types).



Fig. 55. *Phanerotomella rhytisma* Chen & Ji, 2003, China, ♀ (ZJUH No. 201101701), habitus, lateral view. Scale bar: 1.0 mm.

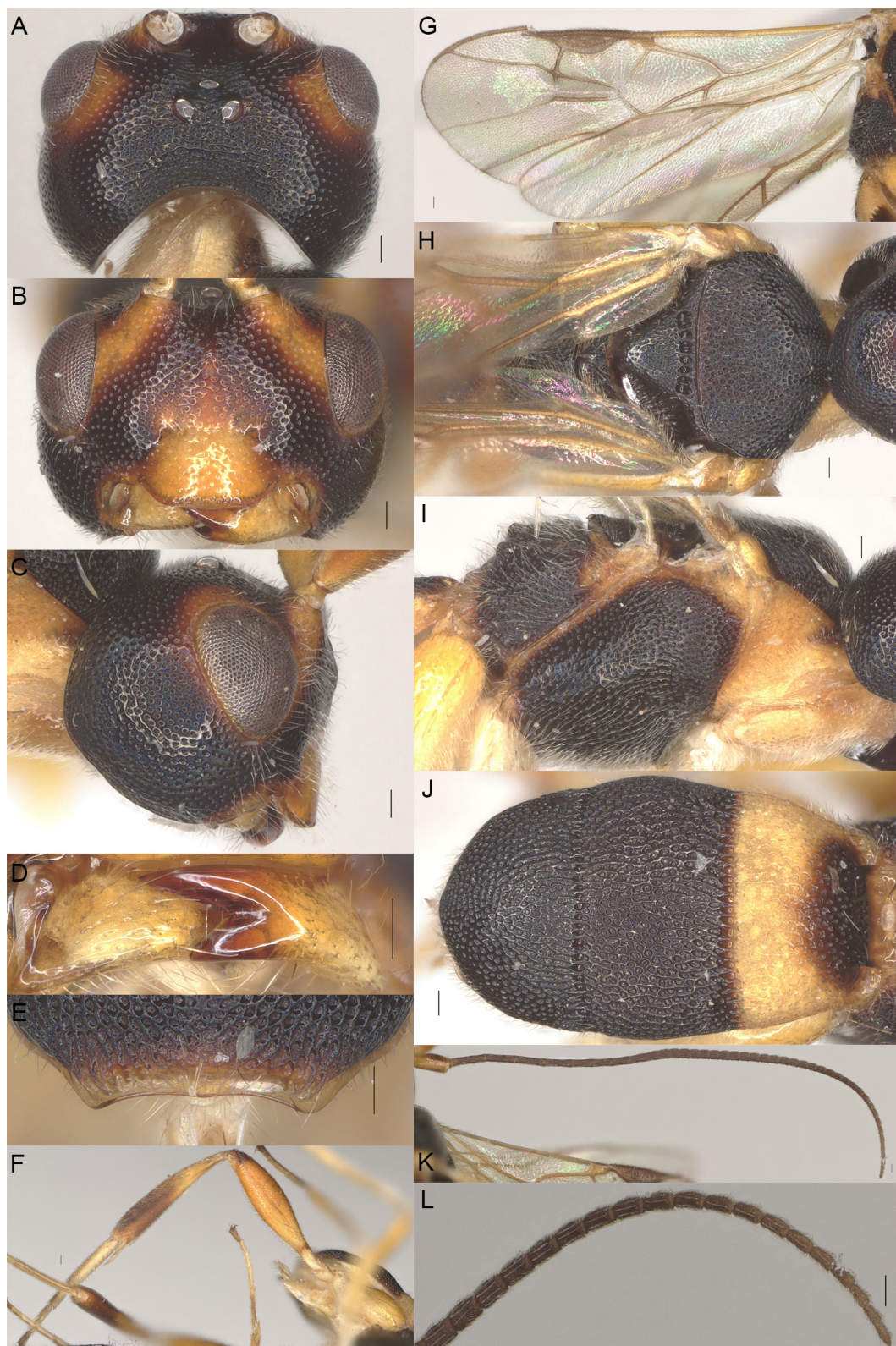


Fig. 56. *Phanerotomella rhytisma* Chen & Ji, 2003, China, ♀ (ZJUH No. 201101701). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

Phanerotomella rugifera sp. nov.

[urn:lsid:zoobank.org:act:55E92A9C-3B43-4C90-9BB2-5987B90CEC4F](https://zoobank.org/urn:lsid:zoobank.org:act:55E92A9C-3B43-4C90-9BB2-5987B90CEC4F)

Figs 57–58

Diagnosis

Head black (Fig. 58A); mesoscutum medially coarsely reticulate (Fig. 58H); scutellar sulcus with 4 large crenulae (Fig. 58H).

Etymology

Named after the nearly entirely coarsely rugose mesopleuron; ‘*ruga*’ is Latin for ‘wrinkle’ and ‘*fera*’ is Latin for ‘carry’.

Type material

Holotype

CHINA – Yunnan • ♀; Xishuangbanna Forest Park; 31 Jul. 2003; L. Hu leg.; ZJUH No. 20048121.



Fig. 57. *Phanerotomella rugifera* sp. nov., holotype, ♀ (ZJUH No. 20048121), habitus, lateral view. Scale bar 1.0 mm.

Paratypes (9 ♀♀, 4 ♂♂)

CHINA – **Yunnan** • 2 ♂♂; same data as for holotype; ZJUH Nos 20048110, 20048118 • 1 ♀; same data as for preceding; ZJUH No. 20048115 • 1 ♀; Xishuangbanna Primeval Forest; 3 Oct. 2004; J.X. Liu leg.; ZJUH No. 20059115 • 2 ♀♀; Xishuangbanna; 3 Oct. 2004; Q. Li leg.; ZJUH Nos 200802691, 200802692 • 1 ♀; Yaoqu, Menglun; elev. ca 540 m; 21°93.000' N, 101°26.000' E; 5 Oct. 2010; J.L. Tang leg.; NWUX • 1 ♀; Xishuangbanna, Menglun; elev. ca 540 m; Bot. Garden; 21°93.000' N, 101°26.000' E; 4 Oct. 2010; J.L. Tang leg.; NWUX • 1 ♂; Xishuangbanna Bot. Garden; 5 Oct. 2020; B.Y. Zheng leg.; ZJUH No. 202300199 • 1 ♀; same data as for preceding; ZJUH No. 202300195 • 1 ♂; Xishuangbanna, Menglun, Botanical Garden; elev. ca 540 m; 21°93.000' N, 101°26.000' E; 5 Oct. 2010; J.L. Tang leg.; NWUX. – **Hainan** • 1 ♀; Diaoluo Mt.; 1 Jun. 2006; J.X. Liu leg.; ZJUH No. 200702333 • 1 ♀; Yinggeling; 23 May 2007; J.X. Liu leg.; ZJUH No. 200702326.

Description

Female

MEASUREMENTS. Length of body 3.1 mm, fore wing 2.8 mm.

COLOURATION. Black; antenna dark brown except scapus and pedicellus yellow; clypeus reddish brown; mandible yellowish and with reddish teeth; prothorax yellow; first metasomal tergite and second tergite medio-anteriorly white; metasoma ventrally white or ivory; fore and middle legs brownish yellow except coxa, trochanter and tibia basally whitish; hind coxa and trochanter ivory, femur and tarsus brownish yellow, hind tibia dark brown but basally white; wing veins and parastigma pale brown, pterostigma dark brown.

HEAD. Width $1.4\times$ median length in anterior view and part of head above eye in lateral view $0.2\times$ height of eye; antenna with 41 segments and $1.6\times$ as long as fore wing, not widened but shortened medially, gradually narrowing apically, subapical segments non-moniliform and longer than wide, third, fourth, tenth, fifteenth and penultimate segments 4.3 , 4.0 , 1.7 , 1.3 and $2.0\times$ as long as wide in lateral view, respectively; area of stemmaticum transversely striate; OOL:OD:POL=21:6:7; length of eye $1.0\times$ temple in dorsal view; frons transversely rugulose and with median carina; vertex reticulate-rugose with short setae; temple finely punctate and shiny; face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus finely punctate and with shiny interspaces, truncate medio-ventrally; eye width in lateral view $0.9\times$ maximum width of temple, eye height in anterior view $0.7\times$ minimum width of face; malar space finely punctate and $1.1\times$ as long as basal width of mandible; mandible somewhat slender, lower tooth of mandible $0.4\times$ as long as apical tooth; face width equal to height of face and clypeus together.

MESOSOMA. Length $1.4\times$ its width in lateral view; side of pronotum superficially punctate-rugulose; mesoscutum densely and finely reticulate except distinctly coarsely reticulate medio-posteriorly; notauli absent; scutellar sulcus with four crenulae; scutellum reticulate; mesopleuron coarsely reticulate and without smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt lateral tubercles.

WINGS. Fore wing $3.6\times$ as long as its maximum width; second submarginal cell petiolate; vein m-cu distinctly postfurcal; veins r and 1-SR+M straight; vein SR1 curved; vein 1-R1 as long as pterostigma; vein r issued far beyond middle of pterostigma, $0.9\times$ vein r-m; r:2-SR:SR1=9:26:45; vein 1-CU1 $0.2\times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=33:45:22.

LEGS. Hind femur $3.6\times$ as long as wide; longest spur of hind tibia $0.5\times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

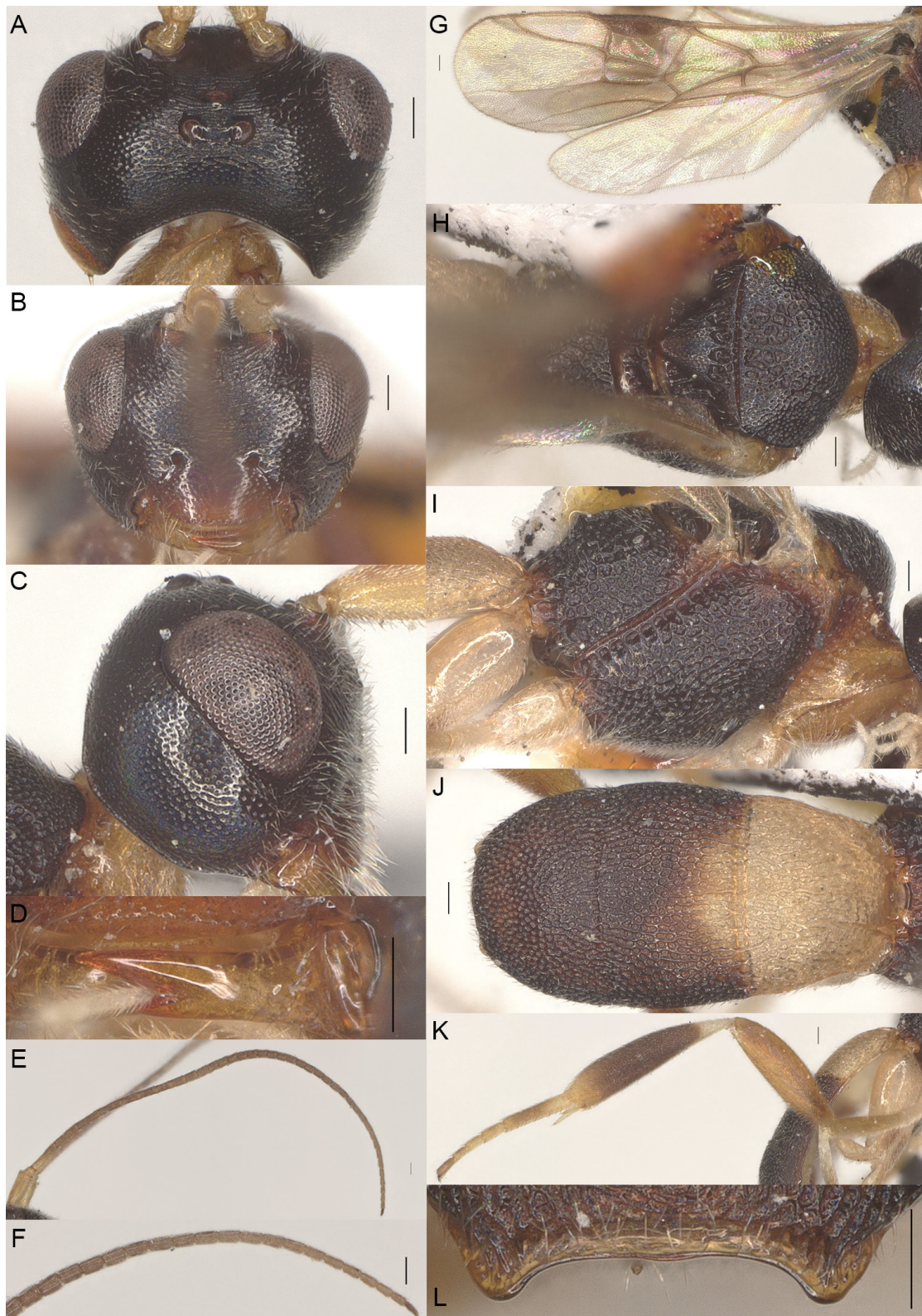


Fig. 58. *Phanerotomella rugifera* sp. nov., holotype, ♀ (ZJUH No. 20048121). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Antenna, lateral view. **F.** Apical antenna, lateral view. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Hind leg. **L.** Lamella, posterior view. Scale bars: 0.1 mm.

METASOMA. Oval in dorsal view, carapace $1.9 \times$ as long as wide and $1.1 \times$ as long as mesosoma; first to third tergites densely reticulate-rugose; third tergite $0.9 \times$ as long as second tergite, medial length of third tergite $0.6 \times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of blunt tubercles latero-apically.

VARIATION. Second submarginal cell weakly petiolate or rarely sessile; length of fore wing of female 2.5–2.9 mm; antenna of female with 41–43 segments; mesoscutum medio-posteriorly, scutellum distally, mesopleuron dorsally and metapleuron more or less yellowish brown; third antennal segment basally more or less yellowish.

Male

Very similar to female, but second metasomal tergite black without yellow patch medio-anteriorly and first metasomal tergite yellow with black patch small or widened medially.

Host

Unknown.

Distribution

China (Hainan, Yunnan).

Remarks

Phanerotomella rugifera sp. nov. is similar to *P. varicolorata* Zettel, 1989 because of the distinctly developed vein 2-SR, the blackish brown metasoma except for the first tergite and the second tergite medio-basally yellow, the length of the fore wing 2.8–3.1 mm, and the eye in lateral view $0.9 \times$ as long as the temple. However, *P. rugifera* can be distinguished from *P. varicolorata* by the black head (yellowish brown in the latter), the mesoscutum being medially coarsely reticulate (finely reticulate in the latter), and the scutellar sulcus with four large crenulae (five small crenulae in the latter).

For additional comparisons with similar species, see remarks under *P. xui* sp. nov.

Phanerotomella rugulosa sp. nov.

[urn:lsid:zoobank.org:act:C57958D5-1F5D-48A5-89B9-B231353D0714](https://zoobank.org/urn:lsid:zoobank.org:act:C57958D5-1F5D-48A5-89B9-B231353D0714)

Figs 59–60

Diagnosis

Hind femur robust, $3.5 \times$ as long as wide (Fig. 60F); metasomal carapace about $1.9 \times$ as long as wide (Fig. 60J); antenna brown but basally yellow (Fig. 60E); temple honeycomb-like sculptured (Fig. 60C); metasomal carapace yellowish brown but third tergite more or less darkened (Fig. 60J); mesopleuron and metasoma honeycomb-like sculptured (Fig. 60I–J); face and frons rugulose (Fig. 60A–B).

Etymology

Named after the laterally finely rugulose frons; ‘*rugula*’ is Latin for ‘small wrinkle’.

Type material

Holotype

CHINA – Taiwan • ♀; Yilan, Taman Mt.; 14 Jun. 2011; P. Tang leg.; ZJUH No. 201104687.

Description

Female

MEASUREMENTS. Length of body 2.7 mm, fore wing 2.7 mm.

COLOURATION. Dark brown; first and second metasomal tergite brownish yellow; metasoma ventrally white or ivory; antenna brown but first to fifth segments yellowish; clypeus brownish yellow; mandible yellowish and with reddish teeth; fore and middle legs yellow; hind leg brownish yellow except tibia dark brown; wing veins and parastigma pale brown, pterostigma dark brown.

HEAD (Fig. 60A–C). Width $1.3 \times$ median length in anterior view (Fig. 60B) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 60C); antenna with 19 + segments, widened and shortened medially, gradually narrowing apically, third, fourth, tenth and fifteenth segments 3.1 , 3.0 , 1.4 and $1.1 \times$ as long as wide in lateral view, respectively (Fig. 60E); area of stemmaticum transversely striate; OOL:OD:POL=20:5:6; length of eye $1.0 \times$ temple in dorsal view (Fig. 60A); frons transversely rugulose and with median carina; vertex reticulate-rugulose with short setae; temple rugulose-reticulate; face rugulose and with distinct median ridge, dorsally connected to median carina; clypeus smooth and shiny except for fine punctation, truncate medio-ventrally; eye width in lateral view $0.9 \times$ maximum width of temple (Fig. 60C), eye height in anterior view $0.6 \times$ minimum width of face (Fig. 60B); malar space rugulose and $1.2 \times$ as long as basal width of mandible; mandible somewhat slender, lower tooth of mandible $0.4 \times$ as long as apical tooth (Fig. 60D); face width equal to height of face and clypeus together.



Fig. 59. *Phanerotomella rugulosa* sp. nov., holotype, ♀ (ZJUH No. 201104687), habitus, lateral view. Scale bar: 1.0 mm.



Fig. 60. *Phanerotomella rugulosa* sp. nov., holotype, ♀ (ZJUH No. 201104687). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Antenna, lateral view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Lamella, posterior view. Scale bars: 0.1 mm.

MESOSOMA (Fig. 60H–I). Length $1.6 \times$ its width in lateral view (Fig. 60I); side of pronotum superficially rugulose-reticulate; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with seven crenulae (Fig. 60H); scutellum reticulate; mesopleuron regularly and densely reticulate and with smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt tubercles laterally.

WINGS (Fig. 60G). Fore wing $2.9 \times$ as long as its maximum width; second submarginal cell sessile; vein m-cu weakly postfurcal; veins r and 1-SR+M straight; vein SR1 slightly curved apically; length of 1-R1 $1.1 \times$ pterostigma; vein r issued far beyond middle of pterostigma, $0.8 \times$ vein r-m; r : 2-SR : SR1 = 11 : 32 : 60; vein 1-CU1 $0.3 \times$ as long as vein 2-CU1. Hind wing: M+CU : 1-M : 1r-m = 23 : 37 : 14.

LEGS (Fig. 60F). Hind femur $3.6 \times$ as long as wide; longest spur of hind tibia $0.5 \times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

METASOMA (Fig. 60J–K). Elliptical in dorsal view (Fig. 60J), carapace $2.0 \times$ as long as wide and as long as mesosoma; first to third tergites densely reticulate-rugose; third tergite as long as second tergite, medial length of third tergite $0.6 \times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of blunt tubercles latero-apically (Fig. 60K).

Male

Unknown.

Host

Unknown.

Distribution

China (Taiwan).

Remarks

Phanerotomella rugulosa sp. nov. is similar to *P. brevifemorata* sp. nov. because of the brown flagellum except basally yellowish, and the temple in dorsal view narrowing behind the eye. However, *P. rugulosa* can easily be distinguished from *P. brevifemorata* by having vein m-cu postfurcal (antefurcal in the latter), the second submarginal cell sessile (distinctly petiolate in the latter), and the lateral border of the metasoma in dorsal view less curved (more curved in the latter).

Phanerotomella sinensis Zettel, 1989

Figs 61–62

Phanerotomella sinensis Zettel, 1989: 24, 29–30.

Phanerotomella sinensis – Papp 1989: 301. — He *et al.* 2001: 47–48, 50; 2004: 640–642. — Chen & Ji 2003: 180, 201–202, 230.

Diagnosis

Eye in lateral view $1.2 \times$ as wide as maximum width of temple (Fig. 62C) and eye in dorsal view strongly protruding (Fig. 62A); mesosoma conspicuously orange-brown (Fig. 62H–I) and contrasting with the black head; metasomal carapace medially black and laterally orange-brown (Fig. 62J); hind coxa pale yellow (Fig. 62F).

Material examined (21 ♀♀, 3 ♂♂)

CHINA – **Zhejiang** • 1 ♀; Hangzhou; 24 Jun. 1989; X.X. Chen leg.; ZJUH No. 893207 • 1 ♀; Hangzhou; 28 Jun. 1991; Q.K. Gao leg.; ZJUH No. 911403 • 1 ♀; Gutian Mt.; 25 Jul. 1992; H. Wu leg.; ZJUH No. 934594 • 3 ♀♀; Kaihua, Gutian Mt.; 2 Jul. 2005; Q. Wu leg.; ZJUH Nos 200602001, 200602002, 200602003 • 6 ♀♀; Kaihua, Gutian Mt.; 3 Jul. 2005; Q. Wu leg.; ZJUH Nos 200602082, 200602084, 200602091, 200602114, 200602115, 200602116 • 4 ♀♀; Kaihua, Gutian Mt.; 1–3 Jul. 2005; X.X. Chen leg.; ZJUH Nos 200604115, 200604194, 200604221, 200604225 • 3 ♀♀; Kaihua, Gutian Mt.; 1–3 Jul. 2005; H.Y. Zhang leg.; ZJUH Nos 200602238, 200602243, 200602245 • 1 ♀; Wuyanling National Reserve; elev. 800 m; Nov. 2005; Y.P. Wang leg.; ZJUH No. 202300199 • 1 ♂; West Tianmu Mt.; 31 May 1998; X.X. Chen leg.; ZJUH No. 980136. – **Guangdong** • 1 ♀; Yangjiang; 11 Jun. 2006; C.H. Xie leg.; ZJUH No. 200611288. – **Hunan** • 1 ♂; Liuyang; 31 May 1985; X.W. Tong leg.; ZJUH No. 20044687. – **Guizhou** • 1 ♂; Leigong Mt., Xiaodan River; 4–5 Jun. 2005; J.X. Liu leg.; ZJUH No. 20059393.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Guizhou, Hunan, Jiangsu, Zhejiang).



Fig. 61. *Phanerotomella sinensis* Zettel, 1989, China, ♀ (ZJUH No. 911403), habitus, lateral view. Scale bar: 1.0 mm.

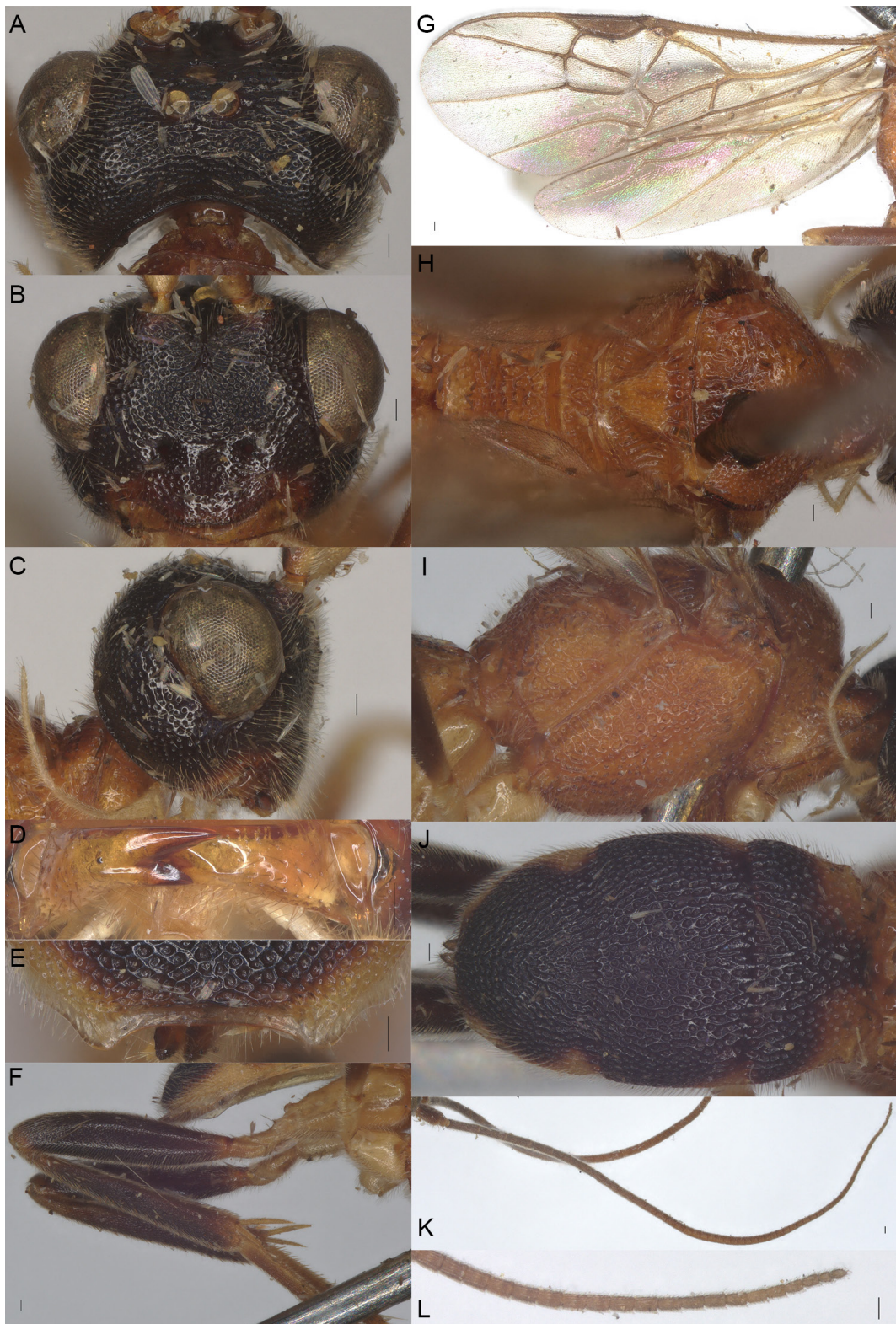


Fig. 62. *Phanerotomella sinensis* Zettel, 1989, China. **A–C, E–L.** ♀ (ZJUH No. 911403). **D.** ♀ (ZJUH No. 200602001). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

Remarks

The holotype from China (Guangdong, Ding-Hu Mts) was not examined and the interpretation here is based on the original description and the additional Chinese specimens listed above. There are 21 females agreeing with the description of *P. sinensis* except for the body length (5.0–6.0 mm vs 5.9–6.2 mm for the types) and the colouration of the mesonotum (one female black vs orange-brown for the types).

Phanerotomella taiwanensis Zettel, 1989

Figs 63–64

Phanerotomella taiwanensis Zettel, 1989: 24, 26–27.

Phanerotomella longipedes Chen & Ji, 2003: 180, 188–189, 229, 253–254. **Syn. nov.**

Phanerotomella taiwanensis – He *et al.* 2001: 47–48, 50; 2004: 641–642. — Chen *et al.* 2001: 726. — Chen & Ji 2003: 180, 202, 229.

Diagnosis

Mesopleuron punctate (Fig. 64I); mesosoma black (Fig. 64H–I); vein 1-SR+M straight (Fig. 64G); vein r curved (Fig. 64G); face and temple punctate and shiny (Fig. 64B–C).

Material examined (9 ♀♀, 19 ♂♂)

CHINA – **Guangdong** • 2 ♀♀; Ruyuan, Nanling; 24 Aug. 2010; P. Tang leg.; ZJUH Nos 201100501, 201100503. – **Yunnan** • 1 ♀; Tengchong, Gaoligong Mt.; 28 May 2009; J.L. Tan leg.; ZJUH No.



Fig. 63. *Phanerotomella taiwanensis* Zettel, 1989, China, ♀ (ZJUH No. 201102527), habitus, lateral view. Scale bar: 1.0 mm.



Fig. 64. *Phanerotomella taiwanensis* Zettel, 1989, China, ♀ (ZJUH No. 201102527). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Antenna, lateral view. **F.** Apical antenna, lateral view. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Lamella, posterior view. **L.** Hind leg. Scale bars: 0.1 mm.

200908200 • 1 ♀; Xishuangbanna; 21°44.761' N, 100°25.959' E; elev. 1595 m; 17 May 2018; Malaise trap; ZJUH No. 201805960. – **Hainan** • 6 ♂♂; Yinggeling; 25 Aug. 2005; L.S. Chen leg.; ZJUH Nos 200611296, 200611297, 200611300, 200611301, 200611303, 200611305 • 1 ♀; same data as for preceding; ZJUH No. 200611302 • 1 ♀; Baisha, Yinggeling; 30 Apr. 2010; J.L. Tan leg.; ZJUH No. 202300194 • 9 ♂♂; Jianfengling; 12–15 Jul. 2006; J.X. Liu leg.; ZJUH Nos 200610607, 200610608, 200610609, 200610614, 200610616, 200610617, 200610620, 200610621, 200610631. – **Zhejiang** • 1 ♀; Linan, West Tianmu Mt., Sanliting; 2 Jul. 2010; W. Chen, S. Dong and F.D. Sun leg.; ZJUH No. 202300200 • 1 ♀; Anji, Longwang Mt., Qianmutian; 28 Jul. 2011; S.N. Song leg.; ZJUH No. 201102527 • 1 ♂; Wuyanling; elev. 800 m; Nov. 2005; Y.P. Wang leg.; ZJUH No. 202300201 • 1 ♂; West Tianmu Mt.; 1–2 Jul. 2000; X.X. Chen leg.; ZJUH No. 200606965. – **Guizhou** • 1 ♀; Fangxiangxiang, Leigong Mt.; elev. 1000 m; 3 Jun. 2005; H.Y. Zhang leg.; ZJUH No. 200605730. – **Guangxi** • 1 ♂; Longsheng, Hongtan; elev. 900 m; 11 Jun. 1963; S.Y. Wang leg.; IOZ(E) No. 2059956. – **Shanxi** • 1 ♂; Lishan; 29 Jul. 2012; Z. Liu leg.; ZJUH No. 201201314.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Guangxi, Guizhou, Hainan, Shanxi, Taiwan, Yunnan, Zhejiang).

Remarks

The holotype of *P. taiwanensis* (♀ from China, Taiwan, Wushe, elev. 1150 m) was not examined because the original description was sufficient for the recognition of this species (Zettel 1989). There are nine females and nineteen males agreeing with the description of *P. taiwanensis*.

The holotype of *P. longipedes* was not available for study, but the mentioned differences are considered to be intraspecific variation.

Phanerotomella longipedes is treated as a junior synonym of *P. taiwanensis* based on the following key characters: (1) 3rd–5th antennal segments white or ivory (fifth may be brownish or up to sixth white) and contrasting with brown scapus; (2) vein m-cu postfurcal; (3) vein r curved; (4) mesopleuron punctate.

Phanerotomella tenuipes sp. nov.

[urn:lsid:zoobank.org:act:046F620F-FD16-4D6A-A422-4025D1F7F962](https://zoobank.org/act:046F620F-FD16-4D6A-A422-4025D1F7F962)

Figs 65–66

Diagnosis

Legs very slender, especially hind leg (Fig. 66L), hind femur about 6.0× as long as wide; body length about 3.5 mm (Fig. 65); face and temple punctate (Fig. 66B–C); mesopleuron rugulose-punctate and with distinctly smooth and shiny area (Fig. 66J); metasomal carapace 1.9× as long as wide (Fig. 66K); vein m-cu postfurcal (Fig. 66H); second submarginal cell sessile (Fig. 66H).

Etymology

Named after the very slender legs; ‘*tenuis*’ is Latin for ‘thin’ and ‘*pedes*’ is Latin for ‘foot’.

Type material

Holotype

CHINA – **Hebei** • ♀; Zhangjiakou, Xiaowutai Mt., Yangjiaping; 20 Aug. 2005; H.Y. Zhang leg.; ZJUH No. 200611860.

Paratypes (3 ♀♀)

CHINA – Yunnan • 1 ♀; Lvchun; 25 Jul. 2003; Z.F. Xu leg.; ZJUH No. 20045215 • 2 ♀♀; Lvchun, Fenshuiling; 25 Jul. 2003; X. Jiang leg.; ZJUH Nos 20045737, 20045800.

Description

Female

MEASUREMENTS. Length of body 3.6 mm, fore wing 3.4 mm.

COLOURATION. Black; metasoma ventrally white or ivory; antenna dark brown; clypeus reddish brown; mandible yellow but basally brownish and with reddish teeth; legs brown except coxae, trochanters and base of femora ivory; wing veins dark brown to pale brown, pterostigma and parastigma dark brown.

HEAD (Fig. 66A–F). Width $1.4 \times$ median length in anterior view (Fig. 66B) and part of head above eye in lateral view $0.2 \times$ height of eye (Fig. 66C); antenna with 34+ segments, not widened but shortened



Fig. 65. *Phanerotomella tenuipes* sp. nov., holotype, ♀ (ZJUH No. 200611860), habitus, lateral view. Scale bar: 1.0 mm.

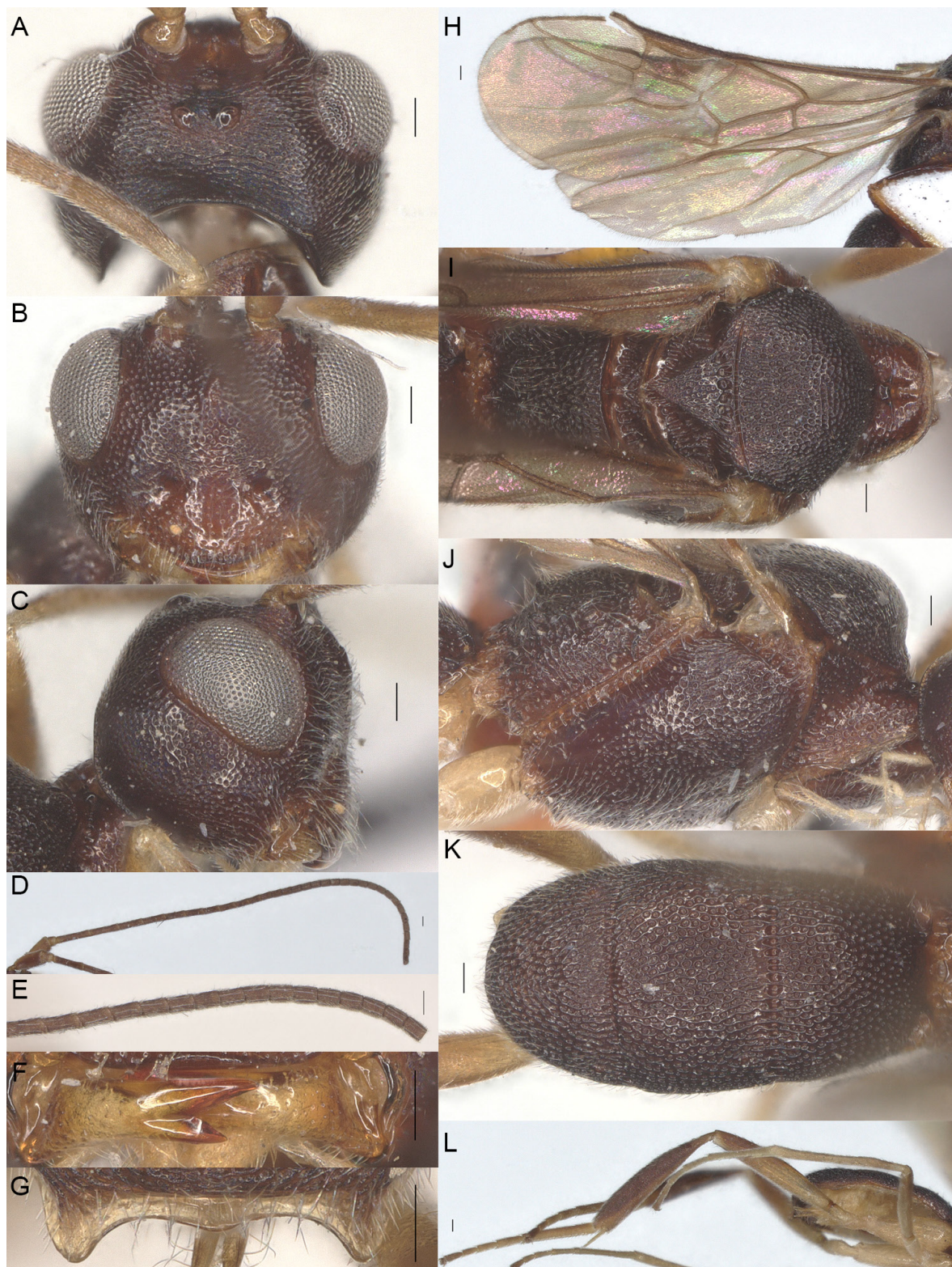


Fig. 66. *Phanerotomella tenuipes* sp. nov. A–E, G–L. Holotype, ♀ (ZJUH No. 200611860). F. Paratype, ♀ (ZJUH No. 20045215). A. Head, dorsal view. B. Head, anterior view. C. Head, lateral view. D. Antenna, lateral view. E. Apical antenna, lateral view. F. Mandible, ventral view. G. Lamella, posterior view. H. Fore and hind wing. I. Mesosoma, dorsal view. J. Mesosoma, lateral view. K. Metasoma, dorsal view. L. Hind leg. Scale bars: 0.1 mm.

medially, gradually narrowing apically, third, fourth, tenth and fifteenth segments 4.9 , 4.3 , 2.7 and $1.7 \times$ as long as wide in lateral view, respectively (Fig. 66D–E); area of stemmaticum transversely striate; OOL:OD:POL=18:6:7; eye $0.9 \times$ as long as temple in dorsal view (Fig. 66A); frons transversely rugulose and with median carina; vertex reticulate-rugose with short setae; temple finely punctate and shiny; face rugulose-punctate and with distinct median ridge, dorsally connected to median carina; clypeus finely punctate and with shiny interspaces, truncate medio-ventrally; eye width in lateral view $0.9 \times$ maximum width of temple (Fig. 66C), eye height in anterior view $0.7 \times$ minimum width of face (Fig. 66B); malar space finely punctate and $1.2 \times$ as long as basal width of mandible; mandible rather slender, lower tooth of mandible $0.6 \times$ as long as apical tooth (Fig. 66F); face width $0.9 \times$ height of face and clypeus together.

MESOSOMA (Fig. 66I–J). Length $1.4 \times$ its width in lateral view (Fig. 66J); side of pronotum superficially rugulose-punctate; mesoscutum regularly and densely reticulate; notauli absent; scutellar sulcus with six crenulae (Fig. 66I); scutellum punctate-rugulose; mesopleuron rugulose-punctate and with distinctly smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt tubercles laterally.

WINGS (Fig. 66H). Fore wing $2.9 \times$ as long as its maximum width; second submarginal cell sessile and vein 3-SR developed; vein m-cu distinctly postfurcal; vein r straight; vein 1-SR+M and SR1 curved; length of 1-R1 $1.2 \times$ pterostigma; vein r issued far beyond middle of pterostigma, $1.0 \times$ vein r-m; r:2-SR:SR1=17:43:76; vein 1-CU1 $0.2 \times$ as long as vein 2-CU1. Hind wing: M+CU:1-M:1r-m=32:49:19.

LEGS (Fig. 66L). Hind femur $6.1 \times$ as long as wide; longest spur of hind tibia $0.4 \times$ as long as its basitarsus; hind leg smooth and shiny except fine and superficial punctation; hind tibia slender; middle tibia without ivory blister.

METASOMA (Fig. 66G, K). Elliptical in dorsal view (Fig. 66K), carapace $1.9 \times$ as long as wide and as long as mesosoma; first to third tergites densely rugulose-reticulate; third tergite $0.8 \times$ as long as second tergite, medial length of third tergite $0.6 \times$ its maximum width; lamella of third tergite weakly protruding medio-apically and with pair of large and pointed tubercles latero-apically (Fig. 66G).

VARIATION. Second submarginal cell sessile but vein 3-SR not developed; length of fore wing of female 2.9–3.4 mm.

Male

Unknown.

Host

Unknown.

Distribution

China (Hebei, Yunnan).

Remarks

Phanerotomella tenuipes sp. nov. is easily distinguished from similar species by having the hind femur $6.0 \times$ as long as wide, the metasoma $1.9 \times$ as long as wide, the antenna slender, the lamella of the third metasomal tergite protruding medio-apically, vein m-cu postfurcal, and the body length 3.5 mm.

Phanerotomella tobiasi Belokobylskij, 1986

Phanerotomella tobiasi Belokobylskij, 1986: 42, 46–48.

Phanerotomella tobiasi – Zettel 1989: 26, 49–50. — Papp 1989: 301. — Tobias 2000: 440–441. — Chen & Ji 2003: 181, 202–203, 231.

Diagnosis

Second submarginal cell very weakly petiolate, about $0.2\times$ as long as vein r or sessile; hind femur comparatively slender, $3.6\times$ as long as wide; OOL $4.4\times$ as long as OD; lamella of third metasomal tergite hardly protruding medio-apically; mesopleuron regularly reticulate but without smooth and shiny area posteriorly.

Host

Unknown.

Distribution

Russia, China (Fujian, Hubei, Yunnan).

Remarks

No material from China is available and the interpretation here is based on the original description of the holotype (female from Far East Russia, Primorsky Krai) and the redescription by Zettel (1989). The species is included here because it was reported from China by Chen & Ji (2003).

Phanerotomella townesi Zettel, 1989

Figs 67–68

Phanerotomella townesi Zettel, 1989: 24, 27–29.

Phanerotomella townesi – He *et al.* 2001: 47–48, 50. — Chen & Ji 2003: 181, 204, 231.

Diagnosis

Face and temple densely punctate and shiny (Fig. 68B–C); mesopleuron largely coarsely rugose and with smooth and shiny area posteriorly (Fig. 68J); scapus white (Fig. 68D); lamella of third metasomal tergite wide (Fig. 68G); hind femur $4.0\times$ as long as wide (Fig. 68L); hind femur brownish yellow except basally white (Fig. 68L); hind tibia dark brown but basally white (Fig. 68L).

Material examined (18 ♀♀, 14 ♂♂)

CHINA – **Fujian** • 1 ♀; Fuzhou, Xianfengling; Jun. 1980; X.F. Zhao leg.; ZJUH No. 880759 • 1 ♀; Jiangle, Longqi Mt.; 11 Aug. 1991; C.M. Liu leg.; ZJUH No. 9610028. – **Zhejiang** • 5 ♂♂; Gutian Mt.; 18–19 Aug. 2003; J.X. Liu leg.; ZJUH Nos 20045233, 20045234, 20045236, 20045237, 20045239 • 2 ♀♀; same data as for preceding; ZJUH Nos 20045235, 20045238 • 1 ♂; Gutian Mt.; 20 Jul. 1992; Y. Ma leg.; ZJUH No. 923188 • 1 ♂; Gutian Mt.; 19 Aug. 2003; W.Q. Fan leg.; ZJUH No. 20047466 • 1 ♂; Tianmu Mt., Xianrending; 12 Jul. 1999; M.S. Zhao leg.; ZJUH No. 200010759. – **Hainan** • 3 ♀♀; Bawangling; 7–11 Jul. 2006; J.X. Liu leg.; ZJUH Nos 200610581, 200610584, 200610589 • 3 ♂♂; Jianfengling; 12–15 Jul. 2006; J.X. Liu leg.; ZJUH Nos 200610603, 200610604, 200610618 • 3 ♀♀; same data as for preceding; ZJUH Nos 200610611, 200610613, 200610627 • 1 ♀; Diaoluo Mt.; 16 Jul. 2006; J.X. Liu leg.; ZJUH No. 200611316 • 1 ♀; Jianfengling, Tianchi; 22–23 Oct. 2007; J.X. Liu leg.; ZJUH No. 200710565 • 2 ♂♂; Jianfengling; 7 Jun. 2007; J.X. Liu leg.; ZJUH Nos 200702340, 200702341 •

1 ♂; Shuiman, Wuzhi Mt.; 16 May 2007; J. Zeng leg.; ZJUH No. 200705121. – **Guangdong** • 1 ♀; Nanling; 16–21 Jul. 2008; Z.F. Xu leg.; ZJUH No. 200807914. – **Yunnan** • 1 ♀; Tengchong, Gaoligong Mt.; 28 May 2009; J.L. Tan leg.; ZJUH No. 200908192 • 3 ♀♀; Bazhai, Yudong Reservoir; Jun. 2017; Z. Liu leg.; ZJUH Nos 202307563, 202307839, 202307977. – **Ningxia** • 1 ♀; Liupan Mt.; 3–14 Jul. 2009; H.Y. Chen leg.; ZJUH No. 200903615.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Hainan, Ningxia, Taiwan, Yunnan, Zhejiang).



Fig. 67. *Phanerotomella townesi* Zettel, 1989, China, ♀ (ZJUH No. 202307977), habitus, lateral view. Scale bar: 1.0 mm.

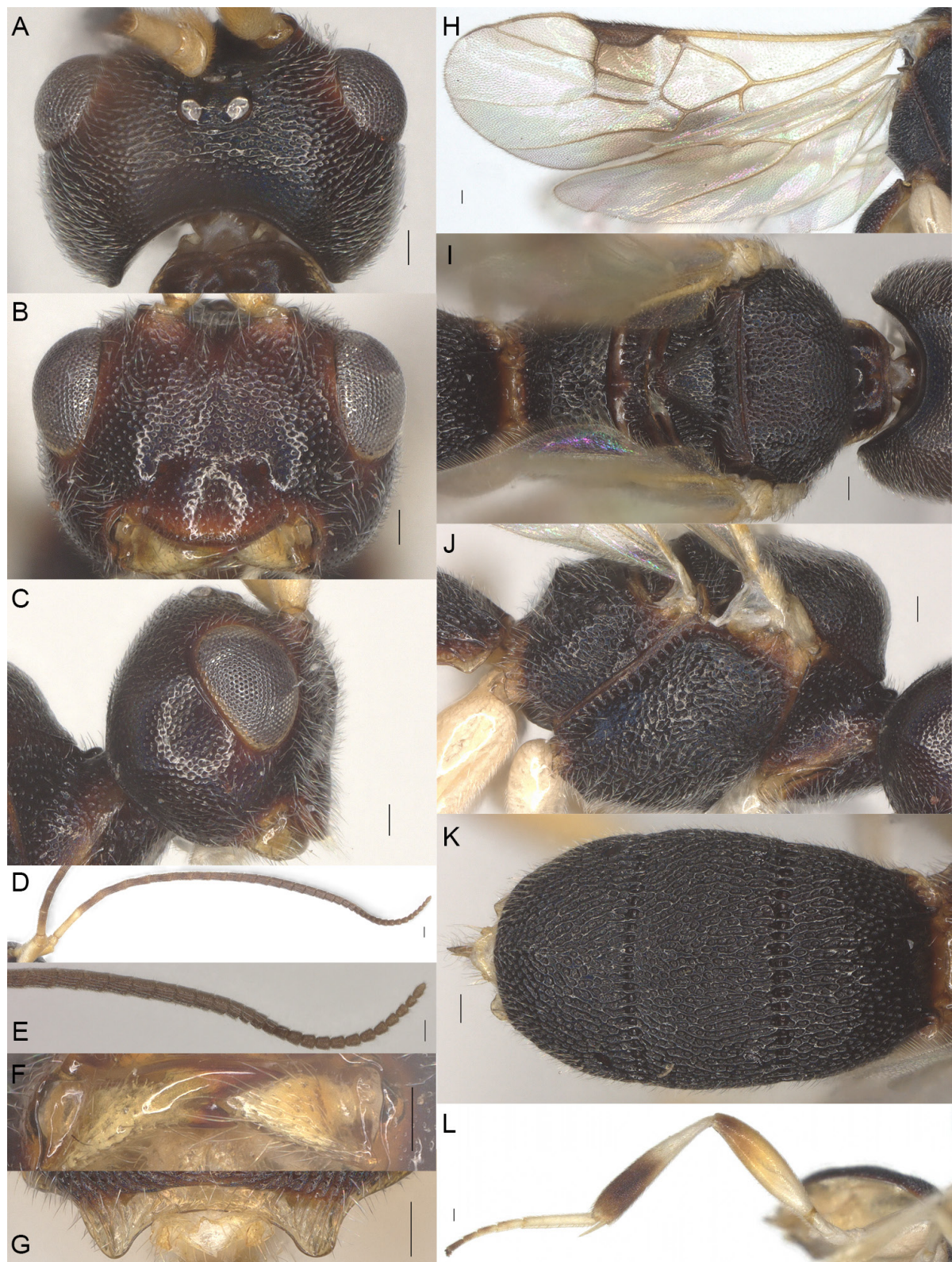


Fig. 68. *Phanerotomella townesi* Zettel, 1989, China, ♀ (ZJUH No. 202307977). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Apical antenna, lateral view. **F.** Mandible, ventral view. **G.** Lamella, posterior view. **H.** Fore and hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Hind leg. Scale bars: 0.1 mm.

Remarks

The female holotype from China (Taiwan, Wushe, elev. 1150 m) was not examined because the original description (in combination with the additional Chinese specimens listed above) was sufficient for the recognition of this species (Zettel 1989). There are eighteen females agreeing with the description of *P. townesi*, except for the body length (3.0–4.0 mm vs 3.4–4.5 mm for the types), as well as fourteen males.

Phanerotomella varicolorata Zettel, 1989

Figs 69–70

Phanerotomella varicolorata Zettel, 1989: 22, 32–34.

Phanerotomella varicolorata – Chen & Ji, 2003: 181, 205–206, 230–231.



Fig. 69. *Phanerotomella varicolorata* Zettel, 1989, China, ♀ (ZJUH No. 200703035), habitus, lateral view. Scale bar: 1.0 mm.

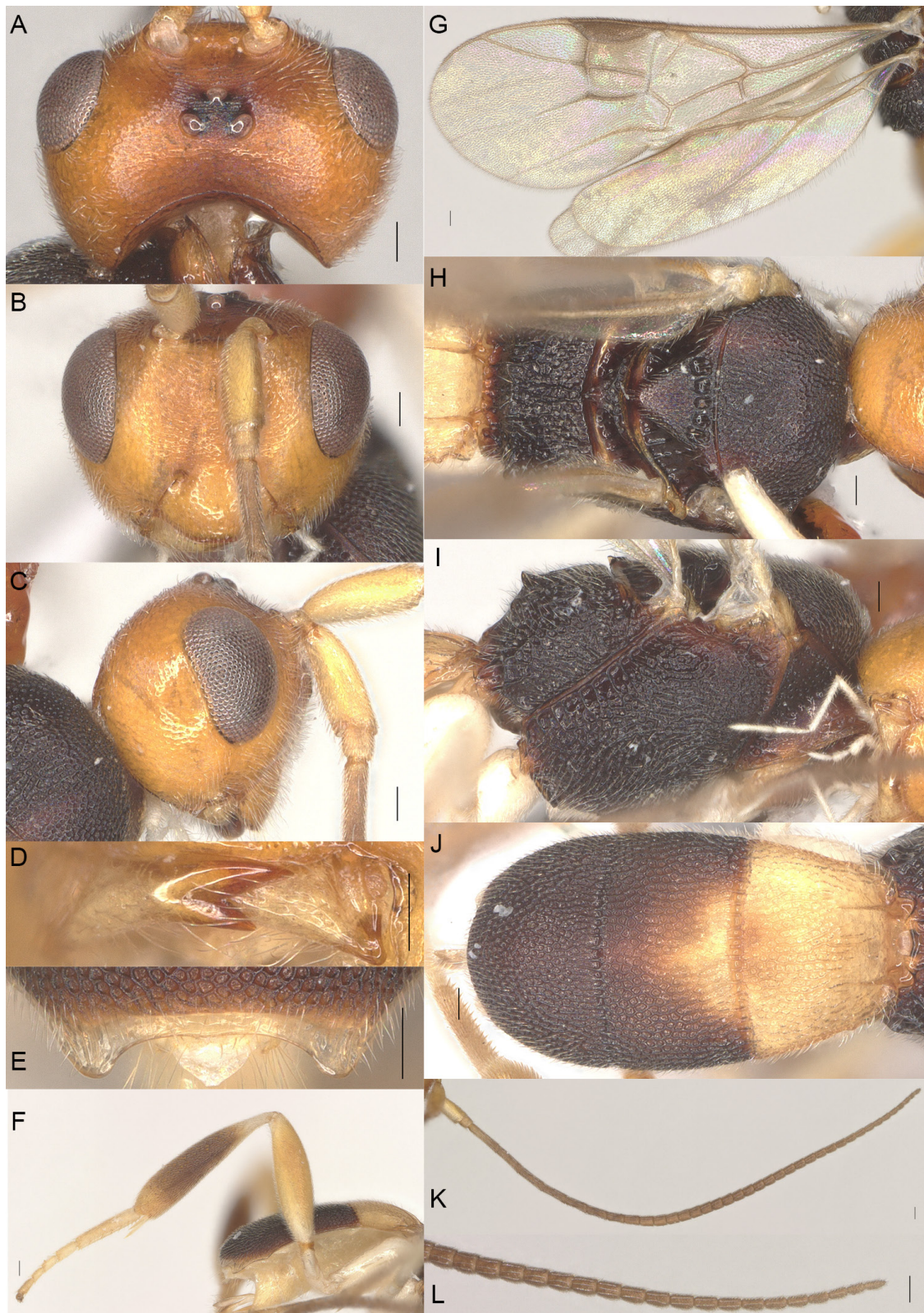


Fig. 70. *Phanerotomella varicolorata* Zettel, 1989, China, ♀ (ZJUH No. 200703035). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

Diagnosis

Head brownish yellow (Fig. 70A); mesoscutum medially finely reticulate (Fig. 70H); scutellar sulcus with 5 small crenulae (Fig. 70H).

Material examined (4 ♀♀)

CHINA – **Hainan** • 1 ♀; Diaoluo Mt.; 28–31 May 2007; J.X. Liu leg.; ZJUH No. 200703035 • 1 ♀; Diaoluo Mt.; 16 Jul. 2006; J.X. Liu leg.; ZJUH No. 200611308 • 1 ♀; Wuzhi Mt.; 16 May 2007; J.X. Liu leg.; ZJUH No. 200702300 • 1 ♀; Shuiman, Wuzhi Mt.; 16 May 2007; J. Zeng leg.; ZJUH No. 200705125.

Host

Unknown.

Distribution

Brunei, China (Hainan, Yunnan), Indonesia, Malaysia, Singapore, Thailand.

Remarks

The holotype from Thailand (Chiang-Mai) was not examined because the original description (in combination with the additional Chinese specimens listed above) is sufficient to recognise this species. There are four females agreeing with the description of *P. varicolorata*.

Phanerotomella xizangensis He & Chen, 2001
Figs 71–72

Phanerotomella xizangensis He & Chen in He *et al.*, 2001: 47–50.

Phanerotomella xizangensis – Chen & Ji 2003: 181, 206–207, 231.

Diagnosis

Face and temple rugulose and matt (Fig. 72B–C); mesopleuron largely finely reticulate and with smooth and shiny area posteriorly (Fig. 72J); scapus brownish yellow (Fig. 72L); lamella of third metasomal tergite narrow (Fig. 72E); hind femur 3.6× as long as wide (Fig. 72F); hind femur and tibia dark brown but basally brownish yellow (Fig. 72F).

Type material

Holotype

CHINA – **Xizang** • ♀; Tongmai; elev. 2050 m; 26 Jul. 1978; F.S. Li leg.; ZJUH No. 871937.

Other material examined (1 ♀)

CHINA – **Yunnan** • 1 ♀; Pingbian, Dawei Mt.; 18 Jul. 2003; Q. Li leg.; ZJUH No. 200802680.

Host

Unknown.

Distribution

China (Xizang, Yunnan).



Fig. 71. *Phanerotomella xizangensis* He & Chen, 2001, holotype, ♀ (ZJUH No. 871937), habitus, lateral view. Scale bar: 1.0 mm.

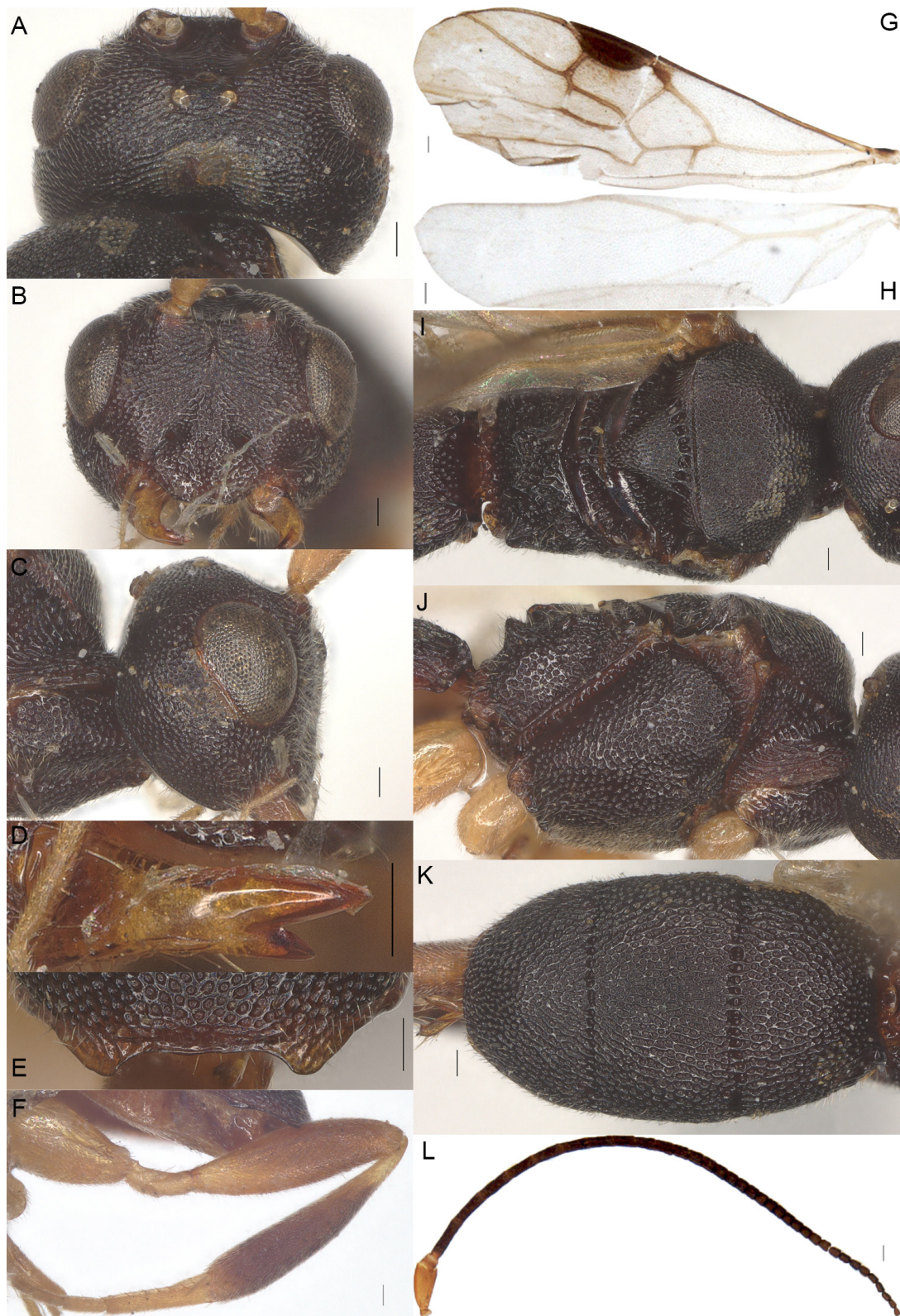


Fig. 72. *Phanerotomella xizangensis* He & Chen, 2001, holotype, ♀ (ZJUH No. 871937). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore wing. **H.** Hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Antenna, lateral view. Scale bars: 0.1 mm.

Phanerotomella xui sp. nov.

urn:lsid:zoobank.org:act:580E809B-8610-4D26-BD67-656CE993DD98

Figs 73–74

Diagnosis

Vein SR1 of fore wing $4.0\times$ as long as vein r (Fig. 74G); length of fore wing 3.6 mm (Fig. 74G); border of metasomal carapace distinctly curved (Fig. 74J); metasoma blackish brown except lateral borders of first tergite yellow (Fig. 74J).

Etymology

Named after the collector of the holotype, the recently deceased hymenopterist Prof. Zai-fu Xu.

Type material

Holotype

CHINA – **Guangdong** • ♀; Zhaoqing, Dinghu Mt.; 11–12 Aug. 2005; Z.F. Xu leg.; ZJUH No. 200610114.

Paratypes (2 ♀♀, 19 ♂♂)

CHINA – **Guangdong** • 4 ♂♂; same data as for holotype; ZJUH Nos 200610111, 200610115, 200610116, 200610118 • 1 ♀; same data as for preceding; ZJUH No. 200610110 • 1 ♂; Ruyuan, Nanling; 23 Jul. 2003; Z.F. Xu leg.; ZJUH No. 20047717 • 1 ♂; Shaoguan, Nanling; 9–18 Jul. 2005; Y.L. Cai leg.; ZJUH No. 200609622. – **Guizhou** • 1 ♀; Leigong Mt., Xiaodan River; 4–5 Jun. 2005; J.X. Liu leg.; ZJUH No. 20059379. – **Guangxi** • 1 ♂; Tianling, Langping; 30 May 1982; J.H. He leg.; ZJUH No. 824581. – **Fujian** • 2 ♂♂; Wuyi Mt., Huanggang; 16 Jul. 1994; X.X. Chen leg.; ZJUH Nos 948714, 948716 • 1 ♂; Guadun; 23 Jun. 1980; J.H. Chen leg.; ZJUH No. 881311 • 1 ♂; Wuyi Mt., Guadun; 15 Jul. 1994; S.F. Ye leg.; ZJUH No. 948722 • 1 ♂; Tongmu; 15 Jul. 1981; J.C. Huang leg.; ZJUH No. 907927 • 1 ♂; Xianfengling; Jun. 1980; X.F. Zhao leg.; ZJUH No. 880756 • 1 ♂; Xianfengling; 30 Jun. 1980; T.F. Xu leg.; ZJUH No. 907925 • 1 ♂; Wuyi Mt., Xianfengling; 20 Jul. 1989; J.S. Wang leg.; ZJUH No. 20005790 • 1 ♂; Wuyi Mt., Xianfengling; 30 Aug. 1989; J.S. Wang leg.; ZJUH No. 20005799 • 1 ♂; Guadang; Jun. 1980; J.C. Huang leg.; ZJUH No. 20003796. – **Zhejiang** • 1 ♂; Taishun, Wuyanling; 1–2 Aug. 2005; Y.P. Wang leg.; Malaise trap; ZJUH No. 200604958 • 1 ♂; Gutian Mt.; 18 Jul. 1992; X.X. Chen leg.; ZJUH No. 923309.

Description

Female

MEASUREMENTS. Length of body 4.0 mm, fore wing 3.6 mm.

COLOURATION. Black; first metasomal tergite yellow except with dark brown patch medially; metasoma ventrally white or ivory; antenna dark brown except scapus and pedicellus whitish; clypeus reddish brown; mandible yellowish and with reddish teeth; fore and middle legs white except tibia apical half and tarsus brown; hind leg dark brown except coxa, trochanter, femur basally, tibia basally and first to fourth tarsal segments white; pterostigma dark brown, parastigma yellowish brown, wing veins dark brown to yellowish brown.

HEAD (Fig. 74A–C, K–L). Width $1.3\times$ median length in anterior view (Fig. 74B) and part of head above eye in lateral view $0.3\times$ height of eye (Fig. 74C); antenna with 44 segments and $1.5\times$ as long as fore wing, hardly widened and distinctly shortened medially, medial segments about as long as wide, gradually narrowing apically, subapical segments non-moniliform and longer than wide, third, fourth, tenth, fifteenth and penultimate segments 5.1 , 4.7 , 1.8 , 1.0 and $3.5\times$ as long as wide in lateral view, respectively (Fig. 74K–L); area of stemmaticum transversely striate; OOL:OD:POL=26:8:7;

eye $0.7\times$ as long as temple in dorsal view (Fig. 74A); frons transversely rugulose and with median carina; vertex rugulose-punctate with short setae; temple punctate and shiny; face punctate-rugulose and with distinct median ridge, dorsally connected to median carina; clypeus finely punctate and with shiny interspaces, truncate medio-ventrally; eye width in lateral view $0.7\times$ maximum width of temple (Fig. 74C), eye height in anterior view $0.8\times$ minimum width of face (Fig. 74B); malar space finely punctate and $1.3\times$ as long as basal width of mandible; mandible somewhat robust, lower tooth of mandible $0.6\times$ as long as apical tooth (Fig. 74D); face width $0.9\times$ height of face and clypeus together.



Fig. 73. *Phanerotomella xui* sp. nov., holotype, ♀ (ZJUH No. 200610114), habitus, lateral view. Scale bar: 1.0 mm.

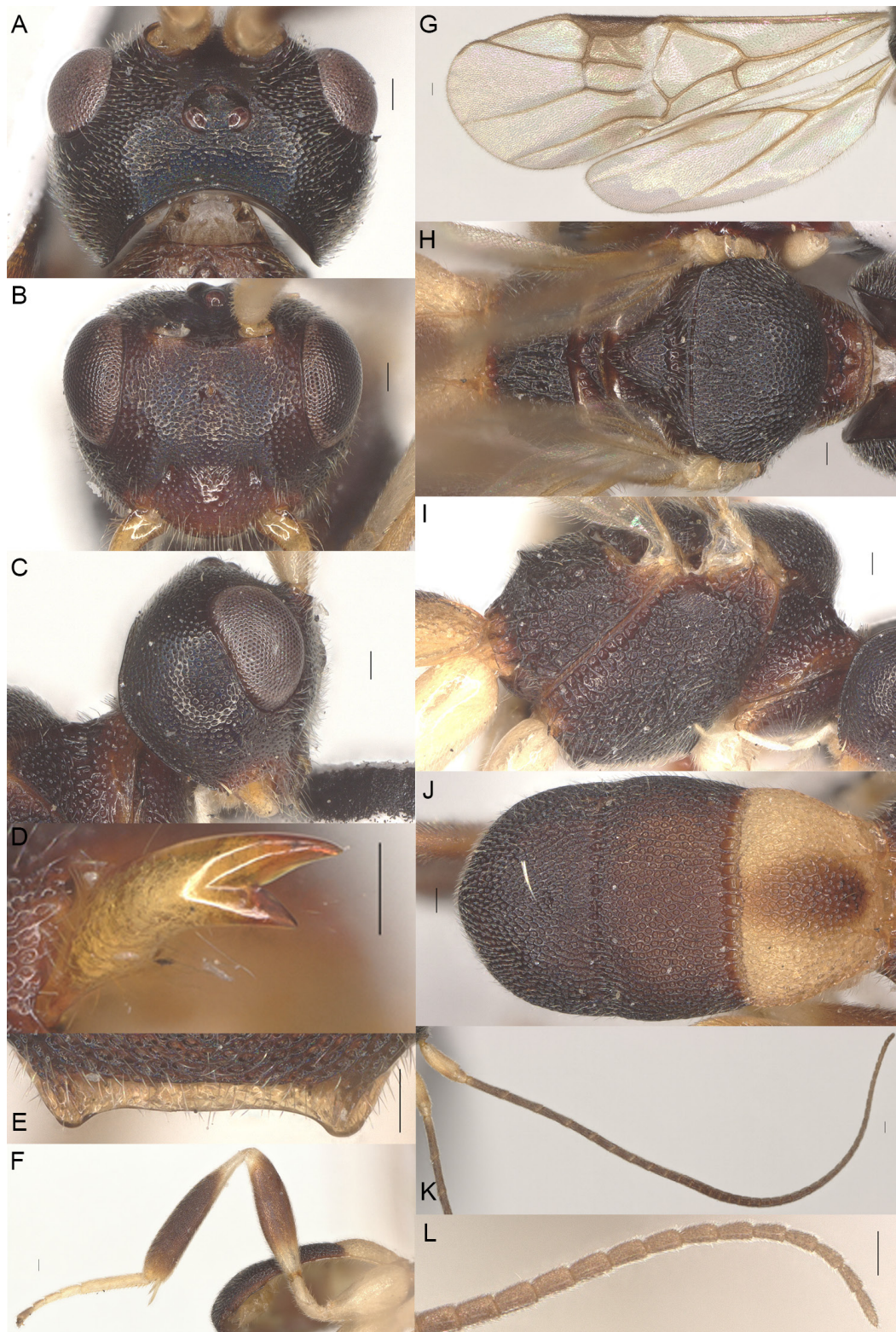


Fig. 74. *Phanerotomella xui* sp. nov. **A, C, E–F, H–L.** Holotype, ♀ (ZJUH No. 200610114). **B, D, G.** Paratype, ♀ (ZJUH No. 20059379). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Lamella, posterior view. **F.** Hind leg. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Antenna, lateral view. **L.** Apical antenna, lateral view. Scale bars: 0.1 mm.

MESOSOMA (Fig. 74H–I). Length $1.4 \times$ its width in lateral view (Fig. 74I); side of pronotum superficially punctate-rugulose and shiny; mesoscutum regularly and densely reticulate except medio-posteriorly slightly coarsened; notauli absent; scutellar sulcus with five crenulae (Fig. 74H); scutellum rugulose-punctate; mesopleuron coarsely reticulate and without smooth and shiny area posteriorly, precoxal sulcus absent; propodeum reticulate, without median carina, with irregular transverse carina connected to four weak and blunt tubercles laterally.

WINGS (Fig. 74G). Fore wing $2.9 \times$ as long as its maximum width; second submarginal cell sessile; vein m-cu distinctly postfurcal; veins r and 1-SR+M straight; vein SR1 curved; length of 1-R1 $0.9 \times$ pterostigma; vein r issued far beyond middle of pterostigma, $1.0 \times$ vein r-m; r : 2-SR : SR1 = 19 : 50 : 75; vein 1-CU1 $0.2 \times$ as long as vein 2-CU1. Hind wing: M+CU : 1-M : 1r-m = 6 : 10 : 5.

LEGS (Fig. 74F). Hind femur $3.9 \times$ as long as wide; longest spur of hind tibia $0.4 \times$ its basitarsus; hind leg smooth and shiny except fine and superficial punctation; middle tibia without ivory blister.

METASOMA (Fig. 74E, J). Oval in dorsal view (Fig. 74J), carapace $1.7 \times$ as long as wide and $1.1 \times$ as long as mesosoma; first to third tergites densely reticulate-rugulose; third tergite $1.1 \times$ as long as second tergite, medial length of third tergite $0.6 \times$ its maximum width; lamella of third tergite not protruding medio-apically and with pair of blunt tubercles latero-apically (Fig. 74E).

VARIATION. Second submarginal cell sessile or weakly petiolate; length of fore wing of female 3.6–3.7 mm; first metasomal tergite yellow and medially with dark brown patch widened or absent.

Male

Very similar to female, but antenna slender medially, hind femur yellow, first metasomal tergite dark brown or yellow with dark brown patch widened.

Host

Unknown.

Distribution

China (Fujian, Guangdong, Guangxi, Guizhou, Zhejiang).

Remarks

Phanerotomella xui sp. nov. is similar to *P. rugifera* sp. nov. because the scapus and pedicellus are ivory and the flagellum brown, the temple in dorsal view slightly narrowing behind the eye, and the mesopleuron reticulate. However, *P. xui* can be distinguished from *P. rugifera* by the eye in dorsal view being $0.7 \times$ as long as the temple ($1.0 \times$ in the latter), vein SR1 $4.0 \times$ as long as vein r ($5.0 \times$ in the latter), the length of the fore wing 3.6 mm (2.8–3.1 mm in the latter), and the border of the metasomal carapace distinctly curved (less curved in the latter).

Phanerotomella yemenitica van Achterberg, 2021

Figs 75–76

Phanerotomella yemenitica van Achterberg, 2021: 112–116.

Diagnosis

Second submarginal cell weakly petiolate (Fig. 76G); metasomal carapace yellowish brown but third and second tergites medio-apically darkened (Fig. 76K); temple rugulose (Fig. 76C); mesopleuron and metasoma honeycomb-like sculptured (Fig. 76J–K).

Material examined

YEMEN – **Ta’izz** • 1 ♀; Baishanzu; 5 Jan.–2 Feb. 1998; A. van Harten leg.; RMNH No. 2910.

CHINA – **Yunnan** • 1 ♀; Dahanjing Village; Jun. 2017; ZJUH No. 202300198.

Host

Unknown.

Distribution

China (Yunnan), Yemen.

Remarks

This female agrees with the description of *P. yemenitica* van Achterberg, 2021.



Fig. 75. *Phanerotomella yemenitica* van Achterberg, 2021, China, ♀ (ZJUH No. 202300198), habitus, lateral view. Scale bar: 1.0 mm.

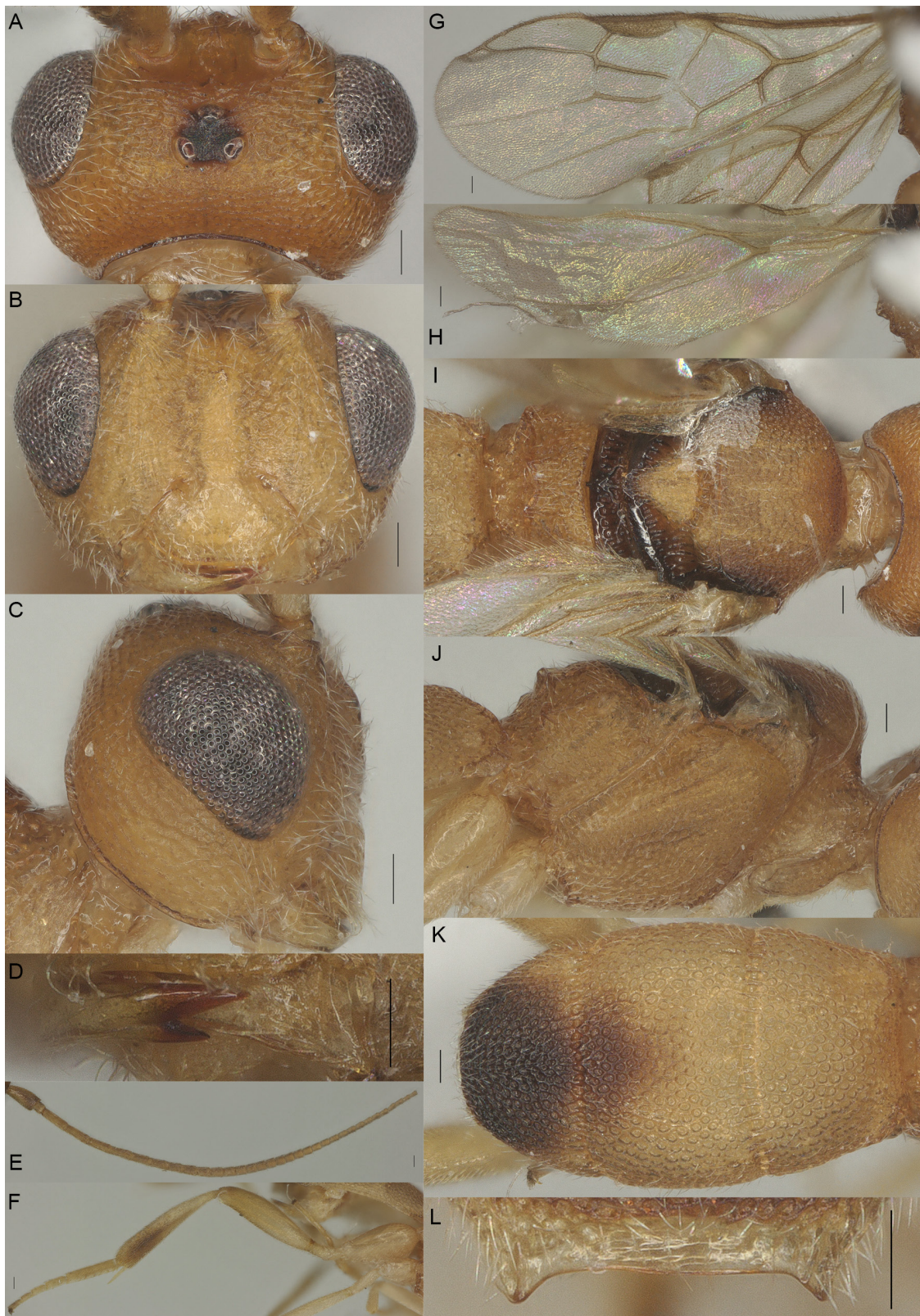


Fig. 76. *Phanerotomella yemenitica* van Achterberg, 2021, China, ♀ (ZJUH No. 202300198). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Mandible, ventral view. **E.** Antenna, lateral view. **F.** Hind leg. **G.** Fore wing. **H.** Hind wing. **I.** Mesosoma, dorsal view. **J.** Mesosoma, lateral view. **K.** Metasoma, dorsal view. **L.** Lamella, posterior view. Scale bars: 0.1 mm.

Phanerotomella zhejiangensis He & Chen, 1995
Figs 77–78

Phanerotomella zhejiangensis He & Chen in He, Chen & Ma, 1995: 562, 564.

Phanerotomella zhejiangensis – He *et al.* 2001: 47–48, 50; 2004: 642–643. — Chen & Ji 2003: 180, 207, 230.

Diagnosis

Mandible robust, inner tooth about $0.7\times$ as long as apical tooth (Fig. 78F); medial length of third metasomal tergite about $0.6\text{--}0.7\times$ as long as second tergite (Fig. 78J); metasomal carapace mainly ivory, at most medially with some small infuscate patches (Fig. 78L).

Type material

Holotype

CHINA – Zhejiang • ♀; Baishanzu; 19 Jul. 1994; H. Wu leg.; ZJUH No. 946873.

Paratype

CHINA – Zhejiang • 1 ♀; Kaihua, Gutian Mt.; 21 Jul. 1992; H. Wu leg.; ZJUH No. 948992.



Fig. 77. *Phanerotomella zhejiangensis* He & Chen, 1995, China, ♀ (ZJUH No. 948992), habitus, lateral view. Scale bar: 1.0 mm.

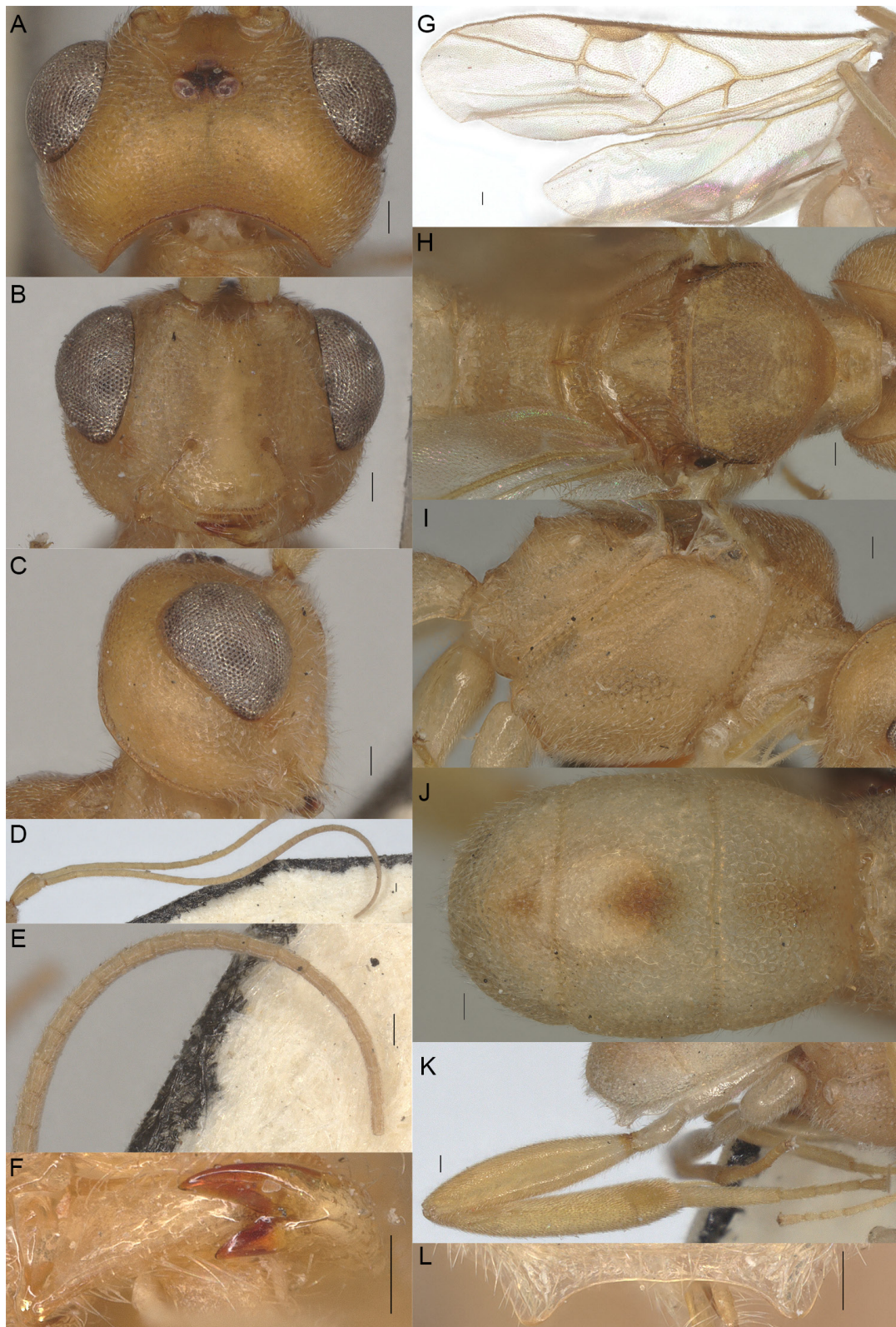


Fig. 78. *Phanerotomella zhejiangensis* He & Chen, 1995, China, ♀ (ZJUH No. 948992). **A.** Head, dorsal view. **B.** Head, anterior view. **C.** Head, lateral view. **D.** Antenna, lateral view. **E.** Apical antenna, lateral view. **F.** Mandible, ventral view. **G.** Fore and hind wing. **H.** Mesosoma, dorsal view. **I.** Mesosoma, lateral view. **J.** Metasoma, dorsal view. **K.** Hind leg. **L.** Lamella, posterior view. Scale bars: 0.1 mm.

Host

Unknown.

Distribution

China (Zhejiang).

Key to Chinese species of the genus *Phanerotomella* Szépligeti, 1900

1. Legs very slender, especially hind leg (Fig. 66L), hind femur about $6.0 \times$ as long as wide; body length about 3.5 mm (Fig. 65); face and temple punctate (Fig. 66B–C); mesopleuron rugulose-punctate and with a distinctly smooth and shiny area (Fig. 66J); [metasoma $1.9 \times$ as long as wide (Fig. 66K); vein m-cu postfurcal (Fig. 66H); second submarginal cell sessile (Fig. 66H)] *P. tenuipes* sp. nov.
 - Legs at least moderately robust (Figs 12F, 64L); if the hind femur is about $6.0 \times$ as long as wide (Figs 4F, 26F), then body length at least 5.0 mm (Figs 3, 25); sculpture of face, temple, and mesopleuron variable 2
2. Vein m-cu of fore wing postfurcal (Figs 4G, 54G) 3
 - Vein m-cu of fore wing antefurcal (Figs 2H, 38G) or interstitial (Figs 20G, 42G) 33
3. Metasoma narrowing to apex and widest at basal half (Fig. 6K); apex of metasoma truncated in dorsal view (Fig. 6K); antenna of female hardly widened medially (Fig. 6D), with 12–14 subapical segments moniliform and 24th–27th segments suddenly wider than long while other segments remain longer than wide (Fig. 6E); temple smooth and shiny (Fig. 6C); mesopleuron punctate and with distinctly smooth and shiny area posteriorly (Fig. 6J); [metasoma in lateral view flat (Fig. 5); second submarginal cell sessile and distinctly narrowed anteriorly (Fig. 6G); temple in dorsal view narrowed behind eye (Fig. 6A); mandible slender and inner tooth of mandible $0.4 \times$ apical tooth (Fig. 6F)] *P. apetila* Chen & Ji, 2003
 - Metasoma narrowing to base and widest at apical half (Fig. 70J) or symmetrically shaped and widest at middle (Figs 14K, 24I); apex of metasoma not truncated in dorsal view (Fig. 14K); antenna of female more or less widened medially (Figs 52K, 68D), if not widened medially then 24th–27th segments at least as long as wide (Fig. 14L); temple and mesopleuron variable 4
4. Parastigma white (Fig. 52G); antenna of female strongly widened medially and with 11–13 subapical segments moniliform (Fig. 52K–L); mandible slender and inner tooth of mandible strongly reduced, 0.2 – $0.3 \times$ as long as its apical tooth (Fig. 52D); [mesopleuron punctate-reticulate and with distinctly smooth and shiny area posteriorly (Fig. 52I); temple superficially rugulose and shiny (Fig. 52C); scapus and pedicellus yellow and contrasting with dark brown flagellum (Fig. 52K); second submarginal cell with petiolate (Fig. 52G)] *P. pallidistigma* Ji & Chen, 2003
 - Parastigma usually yellow or brown (Figs 48H, 50G); antenna of female comparatively less widened medially (Figs 48D, 50K) or very slender (Figs 62K, 64E); mandible more robust and inner tooth of mandible longer, at least $0.4 \times$ as long as apical tooth (Figs 48F, 50D) 5
5. Scapus in lateral view white, ivory, yellow (rarely laterally infuscated), brown or black and fourth antennal segment different in colour (Figs 15, 54K, 64E) 6
 - Scapus in lateral view pale yellow, brownish yellow, infuscated or black (sometimes anteriorly whitish) and fourth antennal segment similar in colour (Figs 4K, 30J, 78D) 22
6. 3rd–5th antennal segments white or ivory (fifth may be brownish or up to sixth white) and contrasting with brown or black scapus (Figs 10K, 18L, 26K, 50K, 64E) 7
 - 3rd–5th antennal segments blackish, dark brown to pale brown and contrasting with white, ivory or yellow scapus (Figs 8D, 16K, 36K, 40K, 48D, 54K, 56K, 58E, 68D, 70K, 72L, 74K) 11

7. Antenna with subapical segments moniliform (Fig. 18L); scapus yellowish brown and contrasting with dark brown apical antennal segments (Fig. 18L); mesopleuron coarsely reticulate (Fig. 18J); metasoma in lateral view flat (Fig. 17); lateral border of metasomal carapace more curved in dorsal view (Fig. 18K)..... *P. bisulcata* (Herrich-Schäffer, 1838)
- Antenna with subapical segments non-moniliform (Figs 26L, 64F); scapus dark brown or black and less contrasting with dark brown or black apical antennal segments (Figs 26K, 64E); mesopleuron densely and rather finely reticulate (Fig. 26I) or punctate (Fig. 64I); metasoma in lateral view curved (Figs 25, 63); lateral border of metasomal carapace comparatively less curved (Figs 26J, 64J) 8
8. Body small, length about 2.7 mm (Fig. 49); mesopleuron densely and finely reticulate and with distinctly smooth and shiny area posteriorly (Fig. 50I); hind tibia dark brown except basally with white part and contrasting with yellowish brown hind femur (Fig. 50F); hind coxa ivory (Fig. 50F); [face and temple rugulose (Fig. 50B–C)] *P. nigrisoma* sp. nov.
- Body distinctly larger, length 4.0–6.1 mm (Figs 9, 25, 63); mesopleuron densely and finely reticulate or punctate but without smooth and shiny area posteriorly (Figs 10I, 26I, 64I); hind tibia black except basally white and less contrasting with black hind femur (Figs 10F, 26F, 64L); hind coxa black except basally whitish (Figs 10F, 26F, 64L) 9
9. Mesopleuron distinctly punctate in lower part (Fig. 64I); mesosoma black (Fig. 64H–I); vein 1-SR+M straight (Fig. 64G); [vein r of fore wing curved (Fig. 64G)]; face and temple punctate and shiny (Fig. 64B–C)] *P. taiwanensis* Zettel, 1989
- Mesopleuron densely and finely reticulate entirely (Figs 10I, 26I); mesosoma orange-brown (Figs 10I, 10H, 26I, 26H); vein 1-SR+M more or less curved (Figs 10G, 26G)..... 10
10. Propodeum with pair of distinctly large and finger-shaped tubercles latero-posteriorly (Fig. 26I); vein 1-SR+M rather curved (Fig. 26G); vein r $0.9 \times$ as long as vein r-m (Fig. 26G); mandible more robust and inner tooth of mandible longer, $0.5 \times$ as long as its apical tooth (Fig. 26D); length of fore wing 5.5 mm; scutellum densely and rather finely reticulate and matt (Fig. 26H); temple rugulose and matt (Fig. 26C); hind tarsus white (Fig. 26F); [metasoma black except first tergite orange-brown (Fig. 26J)] *P. digitata* sp. nov.
- Propodeum with pair of small tubercles latero-posteriorly (Fig. 10I); vein 1-SR+M slightly curved (Fig. 10G); vein r $1.3 \times$ as long as vein r-m (Fig. 10G); mandible slender and inner tooth of mandible reduced, $0.4 \times$ as long as apical tooth (Fig. 10D); length of fore wing 4.6 mm (Fig. 10G); scutellum largely punctate except basally reticulate and shiny (Fig. 10H); temple punctate and shiny (Fig. 10C); hind tarsus dark brown (Fig. 10F) *P. aurantisoma* sp. nov.
11. Body entirely pale yellow except for brown flagellum (Fig. 47); pterostigma, parastigma and veins of fore wing yellow (Fig. 48H); face largely smooth except for fine punctation and less contrasting with smooth clypeus (Fig. 48B); mesopleuron densely and superficially punctate (Fig. 48J); stemmaticum distinctly narrowed, OD $1.3\text{--}1.4 \times$ as long as POL and ocelli arranged in triangle with base $0.9 \times$ its sides (Fig. 48A); [basal carina of first metasomal tergite distinctly developed (Fig. 48K); metasoma regularly reticulate except first tergite longitudinally striate medially (Fig. 48K)] *P. mellivena* van Achterberg, nom. nov.
- Body largely brownish yellow and at most with blackish patches (Fig. 39) or largely black and at most with yellowish patches (Figs 7, 15); pterostigma, parastigma and veins of fore wing pale brown to darkened brown (Figs 8H, 16G); face rugulose or distinctly and densely punctate and strongly contrasting with smooth or finely punctate clypeus (Figs 8B, 16B); mesopleuron coarsely rugose (Figs 16I, 68J), reticulate (Figs 36I, 54I) or distinctly punctate (Figs 8J, 56I) and at most with smooth area posteriorly (Fig. 68J); stemmaticum comparatively enlarged, OD $0.5\text{--}1.0 \times$ as long as POL and ocelli arranged in triangle with base $1.0\text{--}2.0 \times$ as long as its sides (Figs 8A, 16A) 12

12. Face, temple and mesopleuron distinctly punctate (Fig. 56B, 56C, 56I); clypeus yellow and distinctly contrasting with black face (Fig. 56B); mandible rather robust (Fig. 56D); lamella of third metasomal tergite posteriorly with 2 very small and blunt tubercles and less contrasting with lamella (Fig. 56E); [first metasomal tergite ivory and with at least black semi-circular spot medio-basally (Fig. 56J); face black with 2 yellow wide and oblique stripes (Fig. 56B); scapus yellow and contrasting with brown flagellum (Fig. 56K); hind femur yellow except distally with small and black spot (Fig. 56F)] *P. rhytisma* Chen & Ji, 2003
- At least one of face, temple or mesopleuron reticulate or rugulose (Figs 8C, 54B, 58I); clypeus reddish black and less contrasting with black face (Figs 16B, 54B) or clypeus yellow and no contrasting with yellow face (Figs 40B, 70B); mandible comparatively slender (Figs 54D, 58D); lamella of third metasomal tergite posteriorly with 2 distinct but blunt tubercles and strongly contrasting with lamella (Figs 54E, 58L) 13
13. Hind coxa pale yellow except brown apically (Fig. 54F); vein r of fore wing $1.7 \times$ as long as vein r-m (Fig. 54G); hind femur slender, $4.5 \times$ as long as wide (Fig. 54F); [scapus and pedicellus white and strongly contrasting with dark brown flagellum (Fig. 54K); hind femur black and hind tibia black except basal white part (Fig. 54F); hind trochanter and tarsus white (Fig. 54F); mesopleuron densely and regularly reticulate (Fig. 54I); face rugulose (Fig. 54B) but temple densely punctate (Fig. 54C); scutellum largely reticulate except posteriorly punctate (Fig. 54H); temple in dorsal view somewhat widened behind eye (Fig. 54A)] *P. palliscapus* Chen & Ji, 2003
- Hind coxa entirely ivory or yellow (Figs 40F, 68L) and at most with brown spot ventrally (Fig. 58K); vein r of fore wing $0.8\text{--}1.3 \times$ as long as vein r-m (Figs 58G, 72G); hind femur comparatively robust, at most $4.0 \times$ as long as wide (Figs 58K, 72F) 14
14. Antenna of female widened medially and at least 20th–26th segments as long as wide (Figs 68D, 72L); subapical segments moniliform (Figs 68E, 72L); mesopleuron reticulate or rugose and with distinctly smooth and shiny area posteriorly (Figs 68J, 72J) 15
- Antenna of female slender (Figs 16K, 74K) or if widened medially then all segments longer than wide (Fig. 8D); subapical segments non-moniliform (Figs 8E, 16L); mesopleuron punctate, reticulate or rugose but without distinctly smooth and shiny area posteriorly (Figs 8J, 16I) 16
15. Face and temple densely punctate and shiny (Fig. 68B–C); mesopleuron largely coarsely rugose and with smooth and shiny area posteriorly (Fig. 68J); scapus white (Fig. 68D); lamella of third metasomal tergite wide (Fig. 68G); hind femur $4.0 \times$ as long as wide (Fig. 68L); hind femur brownish yellow except basally white (Fig. 68L); hind tibia dark brown except basally white (Fig. 68L) *P. townesi* Zettel, 1989
- Face and temple rugulose and matt (Fig. 72B–C); mesopleuron largely finely reticulate and with smooth and shiny area posteriorly (Fig. 72J); scapus brownish yellow (Fig. 72L); lamella of third metasomal tergite narrow (Fig. 72E); hind femur $3.6 \times$ as long as wide (Fig. 72F); hind femur and tibia dark brown except basally brownish yellow (Fig. 72F) *P. xizangensis* He & Chen, 2001
16. Temple in dorsal view widening behind eye (Fig. 40A); mesosoma largely brownish yellow except in dorsal view lateral borders with dark brown patches (Fig. 40H); temple rugulose and matt (Fig. 40C); mesopleuron reticulate (Fig. 40I); [antenna slender and apical segments non-moniliform (Fig. 40K); metasoma dark brown except first tergite and second tergite medio-basally yellow (Fig. 40J); scapus yellow (Fig. 40K); flagellum basal half brown and distal half yellowish (Fig. 40K)] *P. gladia* Chen & Ji, 2003
- Temple in dorsal view parallel-sided (Figs 16A, 36A) or slightly narrowing behind eye (Figs 8A, 58A); mesosoma entirely black and at most with reddish brown patches (Figs 8I, 70H); at least temple or mesopleuron punctate and shiny (Figs 8J, 70C) 17

17. Mesopleuron distinctly and densely punctate (Fig. 8J); temple rugulose (Fig. 8C); temple in lateral view angularly widened (Fig. 8C); antenna of female distinctly widened medially and subapical segments somewhat serrate (Fig. 8D–E); [scapus and pedicellus yellow (Fig. 8D); flagellum basal half pale brown and apical half dark brown (Fig. 8D); body black except face and clypeus reddish (Figs 7, 8B); hind femur and tibia brown except basally yellowish (Fig. 8L)] *P. atratoides* sp. nov.
- Mesopleuron reticulate (Figs 36I, 58I) or rugose (Fig. 16I); temple punctate or smooth (Figs 16C, 36C); temple rounded in lateral view (Figs 16C, 36C); antenna of female more slender and subapical segments less serrate (Figs 16K, 36K) 18
18. Head in dorsal view more transverse (Figs 16A, 36A); temple in dorsal view parallel-sided behind eye (Figs 16A, 36A); mandible comparatively robust (Figs 16D, 36D) 19
- Head in dorsal view less transverse (Figs 58A, 70A, 74A); temple in dorsal view slightly narrowing behind eye (Figs 58A, 70A, 74A); mandible more slender (Figs 58D, 70D, 74D) 20
19. Basal carina of first metasomal tergite distinctly developed (Fig. 16J); first metasomal tergite distinctly longitudinally striate (Fig. 16J); apex of metasoma less flat (Fig. 16J); temple distinctly finely punctate and shiny (Fig. 16C); mesopleuron coarsely rugose (Fig. 16I) *P. bicolorata* He & Chen, 1995
- Basal carina of first metasomal tergite weakly developed (Fig. 36J); first metasomal tergite finely reticulate (Fig. 36J); apex of metasoma more flat (Fig. 36J); temple smooth and with satin sheen (Fig. 36C); mesopleuron irregularly reticulate (Fig. 36I) *P. fulgida* sp. nov.
20. Vein SR1 $4.0\times$ as long as vein r (Fig. 74G); length of fore wing 3.6 mm (Fig. 74G); border of metasomal carapace distinctly curved (Fig. 74J); metasoma blackish brown except lateral borders of first tergite yellow (Fig. 74J) *P. xui* sp. nov.
- Vein SR1 $5.0\times$ as long as vein r (Figs 58G, 70G); length of fore wing 2.8–3.1 mm (Figs 58G, 70G); border of metasomal carapace more flat (Figs 58J, 70J); metasoma blackish brown except first tergite and second tergite medio-basally yellow (Figs 58J, 70J) 21
21. Head brownish yellow (Fig. 70A); mesoscutum medially finely reticulate (Fig. 70H); scutellar sulcus with 5 small crenulae (Fig. 70H) *P. varicolorata* Zettel, 1989
- Head black (Fig. 58A); mesoscutum medially coarsely reticulate (Fig. 58H); scutellar sulcus with 4 large crenulae (Fig. 58H) *P. rugifera* sp. nov.
22. Antenna with white band on 10th–12th segments (Fig. 4K); mandible basal half blackish and apical half yellowish and with reddish teeth (Fig. 4D); hind femur slender, $5.6\times$ as long as wide (Fig. 4F); [body length about 5.3 mm (Fig. 3); body black (Fig. 3); hind femur black and hind tibia black except basally white (Fig. 4F)] *P. annulata* sp. nov.
- Antenna with yellow or brown band on 10th–12th segments (Figs 24J, 78D); mandible yellowish and with reddish teeth (Figs 24D, 78F); hind femur more or less widened medially, at most $4.6\times$ as long as wide (Figs 62F, 78K) 23
23. Eye distinctly small in dorsal view, $0.6\times$ as long as temple (Figs 30A, 34A); hind femur basal half pale yellow and apical half brown (Figs 30E, 34G); face rugose (Figs 30B, 34B); temple and mesopleuron punctate and with satin sheen (Figs 30C, 30H, 34C, 34K); [mesosoma in lateral view blackish except prothorax pale yellowish (Figs 30H, 34K)] 24
- Eye comparatively large in dorsal view, at least $0.8\times$ as long as temple (Figs 14A, 24A); hind femur entirely yellow (Figs 24E, 60F), brown (Fig. 44F) or black (Figs 14F, 62F); sculpture of face, temple and mesopleuron variable 25

24. Inner tooth of mandible $0.6\times$ as long as apical tooth (Fig. 30D); lamella of third metasomal tergite posteriorly with 2 small and blunt tubercles (Fig. 30L); temple and face largely black except yellowish around eye (Fig. 30B–C); head in dorsal view black except yellow spot around eye (Fig. 30A).....
 *P. emeiensis* sp. nov.
- Inner tooth of mandible $0.4\times$ as long as apical tooth (Fig. 34D); lamella of third metasomal tergite posteriorly without tubercles (Fig. 34M); temple and face entirely yellow (Fig. 34B–C); head in dorsal view reddish brown without yellow spot around eye (Fig. 34A) *P. flavigena* sp. nov.
25. Body distinctly large, length 4.7–6.3 mm (Figs 13, 61); posterior ocellus large and round, OD 1.2 – $1.4\times$ as long as POL (Figs 14A, 62A); hind femur and tibia blackish (Figs 14F, 62F); temple punctate and shiny (Figs 14C, 62C); mesopleuron punctate-reticulate and without smooth area posteriorly (Figs 14J, 62I)..... 26
- Body comparatively small, length 2.7–4.0 mm (Figs 23, 77); posterior ocellus comparatively small, OD at most $0.9\times$ as long as POL (Figs 24A, 78A); hind femur and tibia yellowish or brownish (Figs 24E, 44F); sculpture of temple and mesopleuron variable..... 27
26. Eye in lateral view $1.2\times$ as wide as maximum width of temple (Fig. 62C) and eye in dorsal view strongly protruding (Fig. 62A); mesosoma conspicuously orange-brown (Fig. 62H–I) and contrasting with black head; metasomal carapace medially black and laterally orange brown (Fig. 62J); hind coxa pale yellow (Fig. 62F)..... *P. sinensis* Zettel, 1989
- Eye in lateral view at most $1.0\times$ as wide as maximum width of temple (Fig. 14C) and eye in dorsal view less protruding (Fig. 14A); mesosoma largely black except metanotum and propodeum posteriorly yellowish (Fig. 14I) and less contrasting with black head; metasomal carapace black except basally yellow (Fig. 14K); hind coxa yellow except laterally somewhat dark brown (Fig. 14F).....
 *P. bellula* Papp, 1989
27. Second submarginal cell distinctly petiolate, at least $0.5\times$ as long as vein r (Fig. 44G); mesopleuron and mesoscutum medial-posteriorly irregularly and coarsely rugose (Fig. 44I–J); hind femur dark brown (Fig. 44F); [antennal basal half yellow and apical half brown (Fig. 44E)]
 *P. longa* Ji & Chen, 2003
- Second submarginal cell sessile or weakly petiolate (Fig. 24F, 76G); mesopleuron and mesoscutum rugulose or regularly and finely reticulate (Figs 24G, 24H, 78H, 78I); hind femur yellow (Figs 24E, 78K) 28
28. Mandible robust, inner tooth about $0.7\times$ as long as apical tooth (Fig. 78F); medial length of third metasomal tergite about 0.6 – $0.7\times$ as long as that of second tergite (Fig. 78J); metasomal carapace mainly ivory, at most medially with some small infuscate patches (Fig. 78L)
 *P. zhejiangensis* He & Chen, 1995
- Mandible slender, inner tooth about 0.4 – $0.6\times$ as long as apical tooth (Figs 24D, 60D); medial length of third metasomal tergite about 0.9 – $1.0\times$ as long as that of second tergite (Figs 24I, 60J); metasomal carapace yellow, brown or black, if medially with infuscate patches then distinctly enlarged (Fig. 24I) 29
29. Eye strongly protruding in dorsal view (Fig. 24A); antenna slender (Fig. 24J); metasomal carapace yellow except broadly dark brown medially (Fig. 24I) *P. collinsi* Zettel, 1989
- Eye less protruding in dorsal view (Figs 28A, 60A); antenna widened medially (Figs 28K, 60E); metasomal carapace yellowish brown and at most third tergite and second tergite medio-apically darkened (Figs 60J, 76K) or black (Fig. 28J) 30

30. Hind femur robust, $3.5\times$ as long as wide (Fig. 60F); metasoma about $1.9\times$ as long as wide (Fig. 60J); antenna brown except basally yellow (Fig. 60E); temple honeycomb-like sculptured (Fig. 60C); [metasomal carapace yellowish brown but third tergite more or less darkened (Fig. 60J); mesopleuron and metasoma honeycomb-like sculptured (Figs 60I, 60J); face and frons rugulose (Fig. 60A–B)] *P. rugulosa* sp. nov.
 – Hind femur comparatively slender, $4.0\text{--}4.4\times$ as long as wide (Figs 28F, 76F); metasoma about $1.7\times$ as long as wide (Fig. 28J, 76K); antenna brown (Fig. 76E) or blackish brown (Fig. 28K); temple rugulose (Fig. 76C) or punctate (Fig. 28C) 31
31. Second submarginal cell weakly petiolate (Fig. 76G); metasomal carapace yellowish brown except third tergite and second tergite medio-apically darkened (Fig. 76K); temple rugulose (Fig. 76C); [mesopleuron and metasoma honeycomb-like sculptured (Figs 76J–K)]
 *P. yemenitica* van Achterberg, 2021
 – Second submarginal cell sessile (Fig. 28G); metasomal carapace black (Fig. 28J); temple punctate (Fig. 28C)..... 32
32. Eye in dorsal view $0.8\times$ as long as temple (Fig. 28A); mesopleuron rugulose and with distinct smooth and shiny area posteriorly (Fig. 28I); 21th–28th segments of antenna at most as long as wide (Fig. 28K); first metasomal tergite distinctly longitudinally striate medially (Fig. 28J).....
 *P. distenticornis* sp. nov.
 – Eye in dorsal view $1.2\text{--}1.3\times$ as long as temple; mesopleuron honeycomb-like sculptured but without smooth and shiny area posteriorly; 21st–28th segments of antenna longer than wide; first metasomal tergite finely honeycomb-like sculptured *P. nigricaner* Chen & Ji, 2003
33. Eye distinctly large, in lateral view at least $1.6\times$ as wide as maximum width of temple (Fig. 12C)..
 34
 – Eye comparatively small, in lateral view at most $1.3\times$ as wide as maximum width of temple (Figs 20C, 46C) 35
34. Second submarginal cell strongly petiolate, at least $0.5\times$ as long as vein r (Fig. 12G); hind femur robust, $3.0\times$ as long as wide (Fig. 12F); OOL $3.1\times$ as long as OD (Fig. 12A); lamella of third metasomal tergite distinctly protruding medio-apically (Fig. 12K); mesopleuron regularly reticulate and with smooth and shiny area posteriorly (Fig. 12I); [antenna of female widened medially and 15th–23rd segments as long as wide (Fig. 12D); subapical segments moniliform (Fig. 12E)]
 *P. barbieri* Sigwalt, 1978
 – Second submarginal cell very weakly petiolate, about $0.2\times$ as long as vein r or sessile; hind femur comparatively slender, $3.6\times$ as long as wide; OOL $4.4\times$ as long as OD; lamella of third metasomal tergite hardly protruding medio-apically; mesopleuron regularly reticulate but without smooth and shiny area posteriorly *P. tobiasi* Belokobylskij, 1986
35. Hind femur distinctly swollen medially, at most $3.3\times$ as long as wide (Fig. 22F); metasoma in lateral view strongly curved (Fig. 21); lateral border of metasomal carapace distinctly curved (Fig. 22J); [antenna basal $\frac{1}{3}$ yellow and apical $\frac{2}{3}$ brown (Fig. 22E); second submarginal cell strongly petiolate, about $1.0\times$ as long as vein r (Fig. 22G); mesopleuron reticulate and with distinctly smooth area posteriorly (Fig. 22I); face and temple superficially rugulose (Fig. 22B–C); head yellowish brown except darkened around occipital carina (Fig. 22A); metasoma dark brown except first tergite and second tergite medio-basally yellow (Fig. 22J)]..... *P. brevifemorata* sp. nov.
 – Hind femur slenderer, at least $3.6\times$ as long as wide (Figs 2M, 20K); metasoma in lateral view flatter (Figs 1, 19); lateral border of metasomal carapace comparatively flat (Figs 2L, 20J) 36

36. Antenna of female slender, all flagellum segments longer than wide and with subapical segments non-moniliform (Figs 2D, 32D); posterior ocellus large and round (Figs 2A, 32A) 37
 – Antenna of female widened medially, about 3 subapical segments suddenly wider than long followed by longer segments up to apex and with at least 3 subapical segments moniliform (Figs 20D, 38D, 46E); posterior ocellus comparatively small (Figs 20A, 38A, 46A) 38
37. Scapus and pedicellus in lateral view ivory and distinctly contrasting with dark brown flagellum (Fig. 32D); mesopleuron reticulate and without smooth and shiny area posteriorly (Fig. 32J); lamella of third metasomal tergite not protruding medio-apically (Fig. 32L); clypeus in lateral view less protruding (Fig. 32C); temple distinctly rugulose and matt (Fig. 32C)..... *P. exilicornis* sp. nov.
 – Scapus and pedicellus in lateral view brown with no difference from brown flagellum (Figs 2D, 2E); mesopleuron punctate-reticulate and with distinctly smooth area posteriorly (Fig. 2K); lamella of third metasomal tergite more protruding medio-apically (Fig. 2F); clypeus in lateral view strongly protruding (Fig. 2C); temple superficially rugulose and shiny (Fig. 2C) *P. albiscapa* (Ashmead, 1905)
38. Antenna of female with 14 subapical segments moniliform (Fig. 20D); metasomal carapace 1.6–1.7× as long as wide in dorsal view (Fig. 20J); head entirely yellow (Fig. 20A) *P. bouceki* Zettel, 1989
 – Antenna of female with 3 subapical segments moniliform (Figs 38E, 42E, 46F); metasomal carapace 1.8–1.9× as long as wide in dorsal view (Figs 38J, 42K, 46J); head yellow and with 2 brown or black spots behind eye (Figs 42A, 46A) or brown (Fig. 38A) 39
39. Apex of metasomal carapace truncate in dorsal view (Fig. 38J); mesopleuron reticulate and with distinctly smooth area posteriorly (Fig. 38I); head brown (Fig. 38A); metasoma blackish and at most first and second tergite medially with brownish patches (Fig. 38J); lamella of third metasomal tergite wide and with pair of blunt tubercles (Fig. 38L); [face and temple rugulose (Fig. 38B–C)] *P. fuscitibialis* sp. nov.
 – Apex of metasomal carapace not truncate in dorsal view (Figs 42K, 46J); mesopleuron superficially reticulate and without smooth area posteriorly (Figs 42J, 46I); head yellow and with 2 brown or black spots behind eye (Figs 42A, 46A); metasoma yellow and at most third tergite and lateral borders of first and second tergites darkened (Figs 42K, 46J); lamella of third metasomal tergite comparatively narrow and with pair of pointed tubercles (Figs 42F, 46L) 40
40. Vertex in lateral view strongly angled (Fig. 42C); metasoma symmetrically shaped and with maximum width in middle (Fig. 42K); border of metasomal carapace more curved (Fig. 42K) *P. hawaiiensis* (Ashmead, 1901)
 – Vertex in lateral view flatter (Fig. 46C); metasoma narrowing to base and with maximum width at apical half (Fig. 46J); border of metasomal carapace comparatively flat (Fig. 46J) 41
41. OOL 3.8× as long as OD (Fig. 46A); face width 1.0× height of face and clypeus together (Fig. 46B); metasoma 1.0× as long as mesosoma (Fig. 45); apex of metasomal carapace round in dorsal view (Fig. 46J)..... *P. mariae* Belokobylskij, 1986
 – OOL 3.2× as long as OD; face width 0.95× height of face and clypeus together; metasoma 0.9× as long as mesosoma; apex of metasomal carapace pointed in dorsal view *P. pulchra* Fahringer, 1934 (♂)

Discussion

In this study, the genus *Phanerotomella* has been found in six new provinces in China: Guizhou, Hebei, Henan, Ningxia, Shaanxi and Sichuan (Appendix, blue colour). However, there are still 16 provinces

in China where this genus has not been found. The geographical distribution of insects is of great significance for the management and utilization of insect resources, especially for parasitoid wasps, being natural enemy resources for agricultural pest control. This is one of the reasons to enrich insect collections in China.

This study focused on species identification but lacked research on the hosts of *Phanerotomella*. Currently, there is almost no available study on the hosts of *Phanerotomella*, except for *P. hawaiiensis* (Ashmead, 1901). Host research plays a key role in the application of parasitoids for biological control. Hence, it is important to collect hosts in the field and bring them back to the laboratory for rearing, to understand the biological characteristics of the parasitoids and to study their potential use for biological control.

It was observed that differences in geographical environment can lead to variation in body colour, shape of the metasomal carapace, shape of the temple and the depth of sculpturing within the same species, but these variations lie within a reasonable range. For example, *P. pallidistigma* Ji & Chen, 2003 exhibits this kind of variation: the population of this species in Xizang shows stable variation characteristics distinctly different from the holotype, such as black body, temple distinctly narrowed and the border of the metasomal carapace strongly curved, while key characteristics are consistent with the holotype, such as white parastigma, vein m-cu postfurcal, antenna medially widened and subapically moniliform, mandible slender and inner tooth very short. Therefore, when inspecting specimens, it is important to know the range of variation of the species and to select key features for identification. In this study, we found that a commonly used feature of the second submarginal cell (petiolate or sessile) is unstable, especially when the second submarginal cell is weakly petiolate, it may vary from being sessile to petiolate (i.e. having vein 3-SR developed). The key features for identifying species in this study are as follows: vein m-cu postfurcal, antefurcal, or interstitial; colour of scapus and fourth antennal segment; antenna of female medially widened or not, subapically moniliform or not; mandible robust or slender and second tooth small to medium-sized; and hind femur robust or slender. For other (more rarely used) features, see the key.

This study suggested that *P. rufa* (Marshall, 1898) does not occur in China, which differs from the opinion of Chen & Ji (2003). The description of *P. rufa* (Marshall, 1898) by Chen & Ji (2003) differs from the original description, mainly in terms of vein m-cu of the fore wing. In Chen & Ji (2003), this vein is interstitial in the female, but the original description indicates vein m-cu of the female should be distinctly postfurcal. Additionally, there are differences in other features such as temple narrowed or widened, sculpture and colour of the metasomal carapace, etc.

We propose that *P. variareolata* is a synonym of *P. pulchra*, which was already suggested by Zettel (1989). In addition, five other synonyms are proposed. The differences given by Chen & Ji (2003) are considered to fall within the range of intraspecific variation and the proposed synonymies are consistent with the key features.

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Appendix

Distribution of the genus *Phanerotomella* in China.

