



Monograph

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Revision of the genus *Phanerotoma* Wesmael (Hymenoptera, Braconidae, Cheloninae) from China, with descriptions of twenty-four new species

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Abstract. The Chinese species of the genus *Phanerotoma* (Hymenoptera, Braconidae, Cheloninae) are revised. In total, 44 species are recognised, of which 24 are newly described: *P. acclivirugata* sp. nov., *P. acuticlypealis* sp. nov., *P. aequidentata* sp. nov., *P. coronaria* sp. nov., *P. crassitibialis* sp. nov., *P. duae* sp. nov., *P. emeishanensis* sp. nov., *P. flavicephala* sp. nov., *P. fuscisternalis* sp. nov., *P. inclinata* sp. nov., *P. longzhouensis* sp. nov., *P. macrodentata* sp. nov., *P. microdentata* sp. nov., *P. montana* sp. nov., *P. nigricornis* sp. nov., *P. nigritarsis* sp. nov., *P. ovatipeltata* sp. nov., *P. quadratimaculata* sp. nov., *P. tegularis* sp. nov., *P. tenebricosa* sp. nov., *P. thoracica* sp. nov., *P. truncata* sp. nov., *P. zhaoi* sp. nov. and *P. zhejiangensis* sp. nov. In addition, six species are newly recorded for China: *P. brunneivena* van Achterberg, 2021, *P. grapholithae* Muesebeck, 1933, *P. offensa* Papp, 1989, *P. producta* Watanabe, 1937, *P. semenowi* Kokujev, 1900 and *P. tritoma* (Marshall, 1898). *Phanerotoma flavida* Enderlein, 1912 is synonymised with *P. orientalis* Szépligeti, 1902, and *P. ejuncida* van Achterberg, 2021 is renamed *P. ejuncidoides* van Achterberg nom. nov. This revision is a systematic overview of the morphological features considered reliable for the identification of the Chinese species, such as the relative size of the lower tooth of the mandible, the morphology of the female antenna, the number and size of the medio-ventral teeth of the clypeus, the morphology of the female hypopygium and of the metasomal carapace.

These features have been photographed to illustrate variation and to facilitate identification; hopefully, it will be a template for future research in this genus.

Keywords. China, *Phanerotoma*, new species, new record, new synonymy.

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Introduction

Members of the genus *Phanerotoma* were initially included in the genera *Sigalphus* Latreille, 1802 (Latreille 1809; Nees 1816) or *Chelonus* Panzer, 1806 (Panzer 1805). It was not until 1838 that Wesmael recognised its distinct status and coined the generic name *Phanerotoma* (Wesmael 1838). To date, the genus comprises over 200 described species worldwide and most species occur in subtropical and tropical habitats. The larvae are koinobiont endoparasitoids of mainly Pyralidae and Tortricidae (Yu *et al.* 2016).

The history of this genus in China commenced in 1912 with Enderlein's description of *P. flavida* Enderlein, 1912 from Taiwan. The taxonomic study of the subfamily Cheloninae in mainland China started with Chu (1936), but there was no follow-up until 50 years later. Zettel (1990 a) treated in his reviews of the Oriental species only four species known from China. The Chinese species of *Phanerotoma* were systematically catalogued in publications of He (1987, 1992, 2004) and Chen (1997, 2006 and revised by Chen & Ji (2003). In the latter revision, eleven species of *Phanerotoma* were listed for China with six described as new species. Finally, Tsang *et al.* (2011) published a reared new species from SE China (Guangdong).

Phanerotoma species are rather frequently parasitoids of lepidopteran pests, and several species have a particular preference for species with larvae feeding in concealed habitats (Yu *et al.* 2016). As an internal parasitoid *Phanerotoma* larvae can influence the physiological processes of its hosts at multiple levels (Jones 1996). Consequently, *Phanerotoma* species can play a significant role in the biological control of pests. For instance, *Phanerotoma syleptae* Zettel, 1990 and *P. hendecasisella* Cameron, 1905 have been tested for the biological control of *Maruca vitrata* (Fabricius, 1787), a key pest of legumes (Shivakumara *et al.* 2023; Agountcheme *et al.* 2024). However, there have been no reports of such biocontrol efforts involving *Phanerotoma* species in China. China's territory spans three climatic zones – cold, temperate and tropical – with diverse vegetation and many kinds of microclimates, likely hosting a rich array of species. Given the distribution of known species in China, the study of *Phanerotoma* species in the country needs to be strengthened, as more species await discovery and description. Therefore, this paper is a basic systematic investigation of the species, their distribution and hosts in China. It provides taxonomic knowledge of 44 species found in China, of which more than half are newly described, plus valuable data for the implementation of biological control and integrated pest management strategies. Moreover, it offers scientific support for the management of natural resources and the study of insect faunas.

Material and methods

The Chinese specimens are preserved in the Parasitic Hymenoptera Collection of Zhejiang University, Hangzhou, China (ZJUH); Institute of Zoology, Chinese Academy of Science, Beijing, China (IZCAS) or the Shanghai Entomological Museum, Chinese Academy Science (SEMCAS). Some specimens belong to the Northwest University, Xian, China (NWUX). The morphological terminology and measurements

of body parts follow van Achterberg (1988, 1993) and He *et al.* (2000). The detailed morphological examinations and dimensional assessments were performed utilizing a Nikon stereoscopic microscope (SMZ800N), while the illustrations were produced with the aid of a digital microscope (KEYENCE VHX-7000; Osaka, Japan).

The following abbreviations of morphological terms are used:

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

POL = minimum width between posterior ocelli

In the key additional characters to facilitate further recognition are in square brackets, because these characters also occur in part of the following keyed species.

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Family Braconidae Nees, 1811
Subfamily Cheloninae Foerster, 1863
Genus *Phanerotoma* Wesmael, 1838

***Phanerotoma acclivirugata* sp. nov.**

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Fig. 1

Diagnosis

Clypeus with three comparatively large and slender teeth (Fig. 1D); temple truncate dorsally in lateral view (Fig. 1C); malar space large, $1.4\times$ as long as basal width of mandible (Fig. 1D); hypopygium with robust and short triangular protuberance (Fig. 1I); vein 2-SR of fore wing strongly curved and converging to posterior margin of pterostigma (Fig. 1F); length of 1-R1 of fore wing $1.5\times$ as long as pterostigma (Fig. 1F).

Etymology

Named after the diagonally striate face, from the Latin ‘*acclivis*’ for ‘slope’ and ‘*rugata*’ for ‘wrinkled’.

Type material

Holotype

CHINA – Hebei • ♀; Zhangjiakou, Xiaowutai Mt.; 20 Apr. 2006; Hongying Zhang leg.; ZJUH No. 200611790.

Paratypes (1 ♂, 10 ♀♀)

CHINA – Henan • 1 ♂; Ludai, Qi River; 29 Aug. 1996; Pin Cai leg.; ZJUH No. 972369. – Shaanxi • 2 ♀♀; Wugong; 24 Jul. 1987; ZJUH Nos 200011687 to 200011688 • 1 ♀; same data as for preceding; 20 Jul. 1987; Jingle Zhou leg.; ZJUH No. 200011686 • 1 ♀; Liuquan Dai; 19 Apr. 1987; ZJUH No. 200011766 • 5 ♀♀; Ning Mt., Northwest A&F University; elev. 1580 m; 15 Aug. 1998; Decheng Yuan leg.; IZCAS IOZ(E) 200104779, 200104782, 200104783, 200104810, 200104820 • 1 ♀; Liuba, Miaotaizi village; elev. 1350 m; 19 Jul. 1998; IZCAS IOZ(E) 200104846.

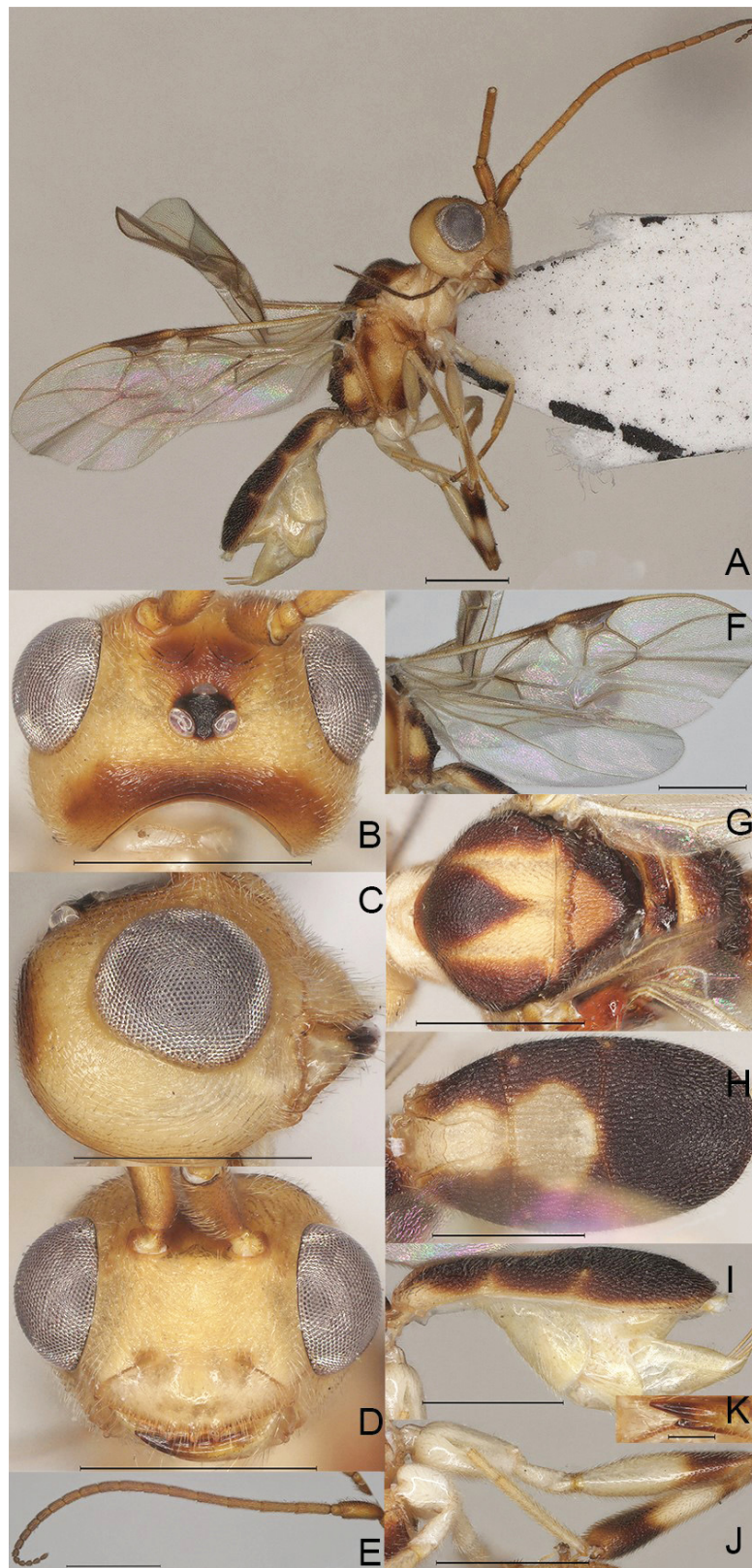


Fig. 1. *Phanerotoma acclivirugata* sp. nov., holotype, ♀ (ZJUH No. 200611790). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

Description

Female

MEASUREMENTS. Length of body 5.6 mm, of fore wing 4.4 mm.

COLOURATION. Yellow; stemmaticum, mandible apically, veins 1-CU1, cu-a and 1-1A of fore wing, pterostigma and parastigma of fore wing partly dark brown; mesosoma largely dark brown; mesosternum with M-shaped pale patch, scutellar sulcus, scutellum and propodeum apically yellow; metasoma largely dark brown; first and second tergites medially and laterally yellow; hind femur and tibia apically dark brown; first segment of antenna laterally, frons medially, temple basally and hind tibia basally brown.

HEAD. Width $1.3 \times$ median length in anterior view (Fig. 1D) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 1C); antenna with 23 segments and $1.3 \times$ as long as fore wing, six subapical antennal segments moniliform (Fig. 1E), shortened and narrowed apically, third, fourth and penultimate segments 1.3 , 1.0 and $1.6 \times$ as long as wide in lateral view; area of stemmaticum mainly granulate; OOL : diameter of posterior ocellus : POL = $32 : 14 : 8$; eye $1.5 \times$ temple in dorsal view (Fig. 1B); frons with longitudinal rugae medially, rugose laterally and without median carina; vertex transversely rugose-striate and with satin sheen; temple largely striate and rather shiny; face transversely or obliquely rugose and without distinct median ridge; clypeus mostly smooth, shiny and as wide as minimum width of face, intertentorial distance $2.6 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 distinct robust teeth medio-ventrally (Fig. 1D); eye medium-sized, in lateral view $1.3 \times$ as wide as temple (Fig. 1C), in anterior view height of eye $0.8 \times$ minimum width of face; upper condyle of mandible relatively close to lower level of eyes (Fig. 1D); malar space $1.4 \times$ as long as basal width of mandible; lower tooth of mandible $0.2 \times$ length of apical tooth, robust (Fig. 1K).

MESOSOMA (Fig. 1G). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide and with nine carinae (Fig. 1G); scutellum triangular, flat, distinctly granulate and rather shiny; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, with transverse carina, no median carina, latero-posteriorly tuberculate.

WINGS. Fore wing $2.7 \times$ as long as its maximum width; length of 1-R1 $1.5 \times$ as long as pterostigma; r issued rather far beyond middle of pterostigma and $0.2 \times$ 3-SR; distance between 1-R1 and wing apex $0.3 \times$ 1-R1; 2-SR strongly curved and converging to posterior margin of pterostigma (Fig. 1F); SR1 slightly bent; 2-SR+M present; parastigma large; 1-CU1 $0.4 \times$ as long as vein 2-CU1, cu-a strongly inclivous and $0.8 \times$ as long as 1-CU1; r : 3-SR : SR1 = $4 : 17 : 49$; 2-SR : 3-SR : r-m = $23 : 17 : 6$; 2-M weakly curved (Fig. 1F).

LEGS (Fig. 1J). Hind femur with satin sheen, $4.3 \times$ as long as wide and rather widened submedially; hind tibia rather swollen (Fig. 1J); middle tibia with medium-sized yellowish blister; hind coxa smooth and shiny.

METASOMA (Fig. 1H–I). Carapace elliptical in dorsal view, $1.9 \times$ as long as wide and $1.1 \times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite $1.9 \times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex anteriorly, in dorsal view convex medially, densely and coarsely rugose and rounded (Fig. 1H), lateral lamella narrow and posteriorly rather wide, not protruding latero-apically and medio-apically emarginate; ovipositor sheath narrow and parallel-sided, with some long and erect setae; hypopygium apically robust, no spine, but with short up-curved and setose triangle (Fig. 1I).

VARIATION. Length of fore wing of female 4.4–5.2 mm, of male 4.0 mm; third tergite $1.6\text{--}1.9\times$ as long as second tergite, curved to nearly straight laterally; second tergite dark brown laterally to entirely so; POL $0.6\text{--}0.7\times$ as long as diameter of posterior ocellus; eye medium-sized and in lateral view $1.3\text{--}1.4\times$ as wide as temple; vein 2-SR of fore wing curved to bent.

Male

Very similar to female, but six subapical antennal segments slender and not moniliform; third tergite without medio-apical emargination; hind femur yellowish brown.

Host

Unknown.

Distribution

China (Hebei, Henan, Shaanxi).

Phanerotoma acuticlypealis sp. nov.

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Fig. 2

Diagnosis

Vein r of fore wing nearly linear with vein 3-SR (Fig. 2F); subapical segments of female antenna cylindrical (Fig. 2J); vein 2-M of fore wing without pigmentation (Fig. 2F); vein 1-M narrow apically; hind femur entire yellowish brown (Fig. 2I); third metasomal tergite about $1.4\times$ as long as second tergite (Fig. 2H).

Etymology

Named after the acutely protruding clypeus, from the Latin ‘*acutus*’ for ‘pointed’ and ‘*clypeus*’ for ‘shield’.

Type material

Holotype

CHINA – **Guizhou** • ♀; Mayang, Mayang River; 27–30 Sep. 2007; Jingxian Liu leg.; ZJUH No. 200708717.

Paratypes (4 ♀♀)

CHINA – **Guizhou** • 3 ♀♀; same data as for holotype; ZJUH Nos 200708779, 200708724, 200708478.
– **Taiwan** • 1 ♀; Yilan; Fushan Botanical Garden; 11 Jun. 2011; Pu Tang leg.; ZJUH No. 201105208.

Description

Female

MEASUREMENTS. Length of body 4.4 mm, of fore wing 3.5 mm.

COLOURATION. Yellow; stemmaticum dark brown; mandible apically brown; mesoscutum anteriorly with transverse groove between mesonotum and metanotum, and between metanotum and propodeum, propodeum, pterostigma, parastigma and hind tibia apically brown.

HEAD. Width $1.5\times$ median length in anterior view (Fig. 2D) and part of head above eye in lateral view $0.2\times$ height of eye (Fig. 2C); antenna with 23 segments and $1.3\times$ as long as fore wing, antennal segments cylindrical (Fig. 2J), third, fourth and penultimate segments 2.2 , 2.2 and $1.7\times$ as long as wide in lateral

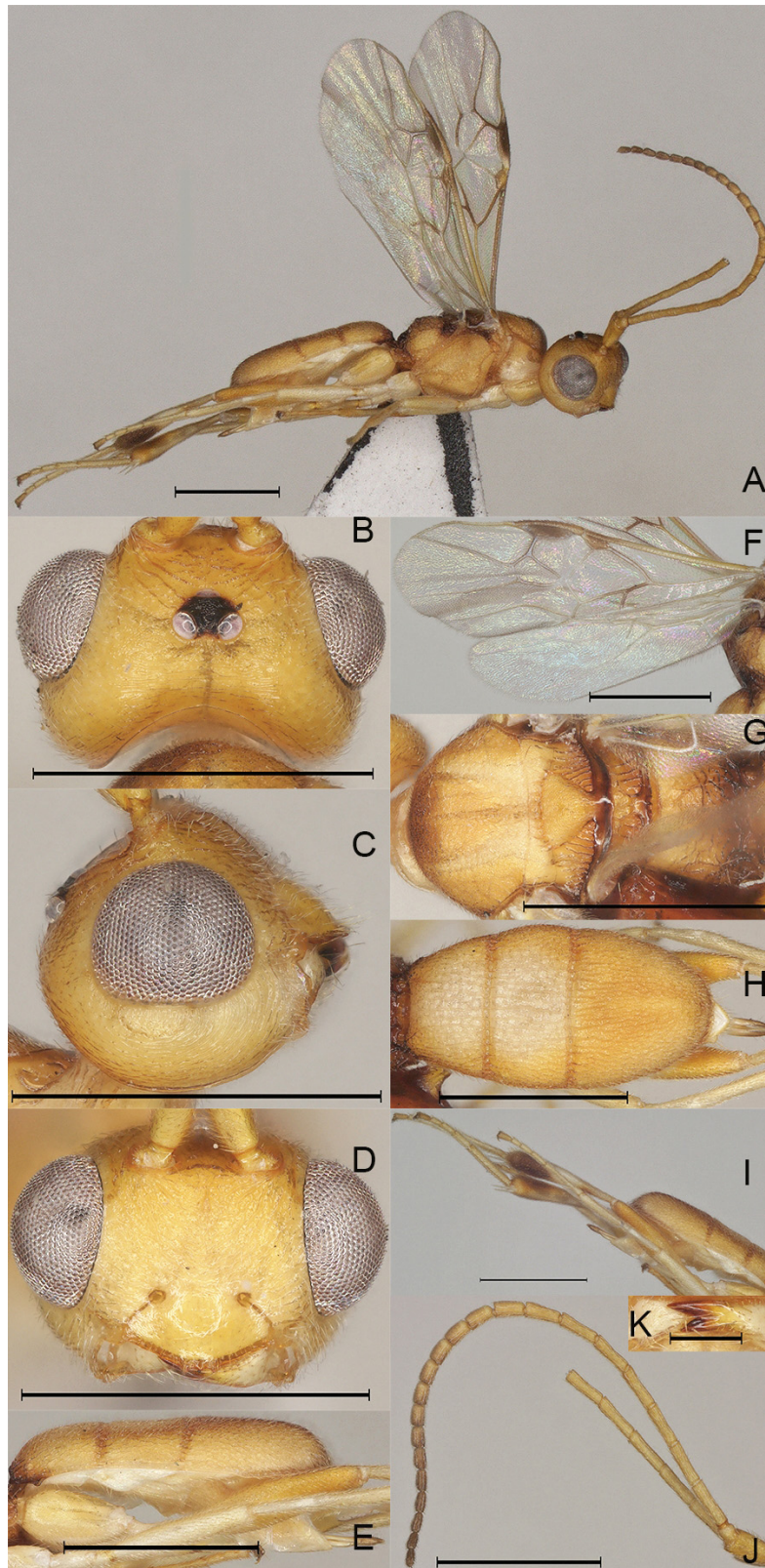


Fig. 2. *Phanerotoma acuticlypealis* sp. nov., holotype, ♀ (ZJUH No. 200708717). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Metasoma, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Hind leg. **J.** Antenna, lateral view. **K.** Mandible, ventral view. Scale bars: A–J = 1 mm; K = 0.2 mm.

view; area of stemmaticum mainly granulate; OOL : diameter of posterior ocellus : POL = 18 : 7 : 5; eye $1.5 \times$ temple in dorsal view (Fig. 2B); frons with diagonal rugae and without median carina; vertex small and shiny; temple transversely rugose and shiny; face diagonally rugose and without distinct median ridge (Fig. 2D); clypeus punctate, smooth and $0.7 \times$ minimum width of face, intertentorial distance $2.8 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 small teeth medio-ventrally (Fig. 2D); eye large and in lateral view $1.6 \times$ as wide as temple (Fig. 2C), in anterior view its height $0.8 \times$ minimum width of face (Fig. 2D); malar space $0.7 \times$ thin space before x as long as basal width of mandible; lower tooth of mandible $0.7 \times$ length of apical tooth, robust (Fig. 2K).

MESOSOMA (Fig. 2G). Length $1.7 \times$ its width in lateral view; pronotum mainly smooth; mesoscutum densely granulate-rugose and shiny, densely setose; notauli hardly indicated; scutellar sulcus wide and with nine carinae (Fig. 2G); scutellum triangular, convex, distinctly granulate and shiny; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, without transverse carina, no median carina, latero-posteriorly tuberculate.

WINGS. Fore wing $3.2 \times$ as long as its maximum width; length of 1-R1 $1.4 \times$ as long as pterostigma; r as long as 3-SR; distance between 1-R1 and wing apex $0.4 \times$ 1-R1; 2-SR nearly straight (Fig. 2F); SR1 straight; 2-SR+M present; parastigma small; 1-CU1 $0.5 \times$ as long as vein 2-CU1, cu-a oblique and $0.8 \times$ as long as 1-CU1; r : 3-SR : SR1 = 1 : 1.5; 2-SR : 3-SR : r-m = 2 : 1 : 1; 2-M curved (Fig. 2F).

LEGS (Fig. 2I). Hind femur with satin sheen, $6.0 \times$ as long as wide and rather widened submedially; hind tibia slender (Fig. 2I); middle tibia with medium-sized ivory blister; hind coxa coriaceous and matt.

METASOMA (Fig. 2E, H). Carapace elliptical in dorsal view, $1.9 \times$ as long as wide and as long as mesosoma; first and second tergites coarsely longitudinally rugose; second suture wide; third tergite $1.7 \times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view convex medially, densely and semi-circularly rugose and rounded (Fig. 2H), without lamella and weakly emarginate posteriorly; ovipositor sheath narrow and parallel-sided, with some long and erect setae; hypopygium apically acute, lacking an up-curved triangle or apical spine (Fig. 2E).

VARIATION. Length of fore wing of female 3.3–3.5 mm; eye in lateral view 1.4 – $1.6 \times$ as wide as temple; third tergite 1.6 – $1.7 \times$ as long as second tergite.

Male

Unknown.

Biology

Unknown.

Distribution

China (Guizhou, Taiwan).

Phanerotoma aequidentata sp. nov.

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Fig. 3

Diagnosis

Both teeth of mandible blunt and of subequal length (Fig. 3K); first discal cell of fore wing comparatively wide (Fig. 3F); second submarginal cell of fore wing large and wide; metasomal carapace coarsely rugose (Fig. 3H); temple as long as eye in dorsal view (Fig. 3B); hind tibia weakly swollen (Fig. 3E);

mesosternum with satiny sheen and superficially coriaceous; parastigma dark brown and vein 1-M of fore wing brown.

Etymology

Named after the blunt and subequal mandibular teeth, from the Latin '*aequoreus*' for 'same level' and '*dens*' for 'tooth'.

Type material

Holotype

CHINA—Yunnan • ♀; Bao Mt., Gaoligong Range; 16–17 Jul. 2006; Jie Zeng leg.; ZJUH No. 200611348.

Description

Female

MEASUREMENTS. Length of body 5.5 mm, of fore wing 4.4 mm.

COLOURATION. Yellow; stemmaticum, pterostigma, parastigma, veins 1-CU1, cu-a, 3-SR, SR1 and 2-M of fore wing dark brown; antenna, teeth of mandible and hind tibia apically brown.

HEAD. Width $1.3 \times$ median length in anterior view (Fig. 3D) and part of head above eye in lateral view $0.4 \times$ height of eye (Fig. 3C); antenna with 23 segments, five subapical segments moniliform, and narrow and slender (Fig. 3J); area of stemmaticum mainly granulate; OOL: diameter of posterior ocellus:POL=35:11:9; eye $1.1 \times$ as long as temple in dorsal view (Fig. 3B); frons with oblique rugae medially, rugose laterally and with median ridge; vertex and temple granulate-rugose and with satin sheen; face obliquely rugose laterally and transversely rugose medially, with short median ridge medially; clypeus $0.9 \times$ minimum width of face, intertentorial distance $2.0 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 robust and long teeth medio-ventrally (Fig. 3D); temple large, in lateral view $1.1 \times$ as wide as eye (Fig. 3C), in anterior view height of eye $0.7 \times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 3D); malar space $1.1 \times$ as long as basal width of mandible; lower tooth of mandible $0.3 \times$ length of apical tooth, both teeth apically truncate (Fig. 3K).

MESOSOMA (Fig. 3G). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 3G); scutellum triangular, wide and flat, granulate-rugose and rather shiny; metanotum with indistinct short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, weakly latero-posteriorly tuberculate, no transverse carina or median carina.

WINGS. Length of 1-R1 $1.6 \times$ as long as pterostigma; r of fore wing $0.2 \times$ as long as 3-SR; distance between 1-R1 and wing apex $0.3 \times$ 1-R1; 2-SR strongly bent (Fig. 3F); SR1 distinctly curved; 2-SR+M present; pterostigma large, parastigma medium-sized; 1-CU1 $0.4 \times$ as long as vein 2-CU1, cu-a oblique and $0.9 \times$ as long as 1-CU1; r:3-SR:SR1=1:5:12; 2-SR:3-SR:r-m=3:3:1; 2-M bent; marginal cell and second submarginal cell large (Fig. 3F).

LEGS (Fig. 3E). Hind femur with satin sheen, $5.0 \times$ as long as wide and widened submedially; hind tibia slender (Fig. 3E); middle tibia with large pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 3H–I). Carapace elliptical in dorsal view, $1.8 \times$ as long as wide and $1.2 \times$ as long as mesosoma; first and second tergites coarsely and densely rugose; second suture wide; third tergite $1.7 \times$ as long as second tergite and laterally weakly curved, in lateral view concave posteriorly, in dorsal view

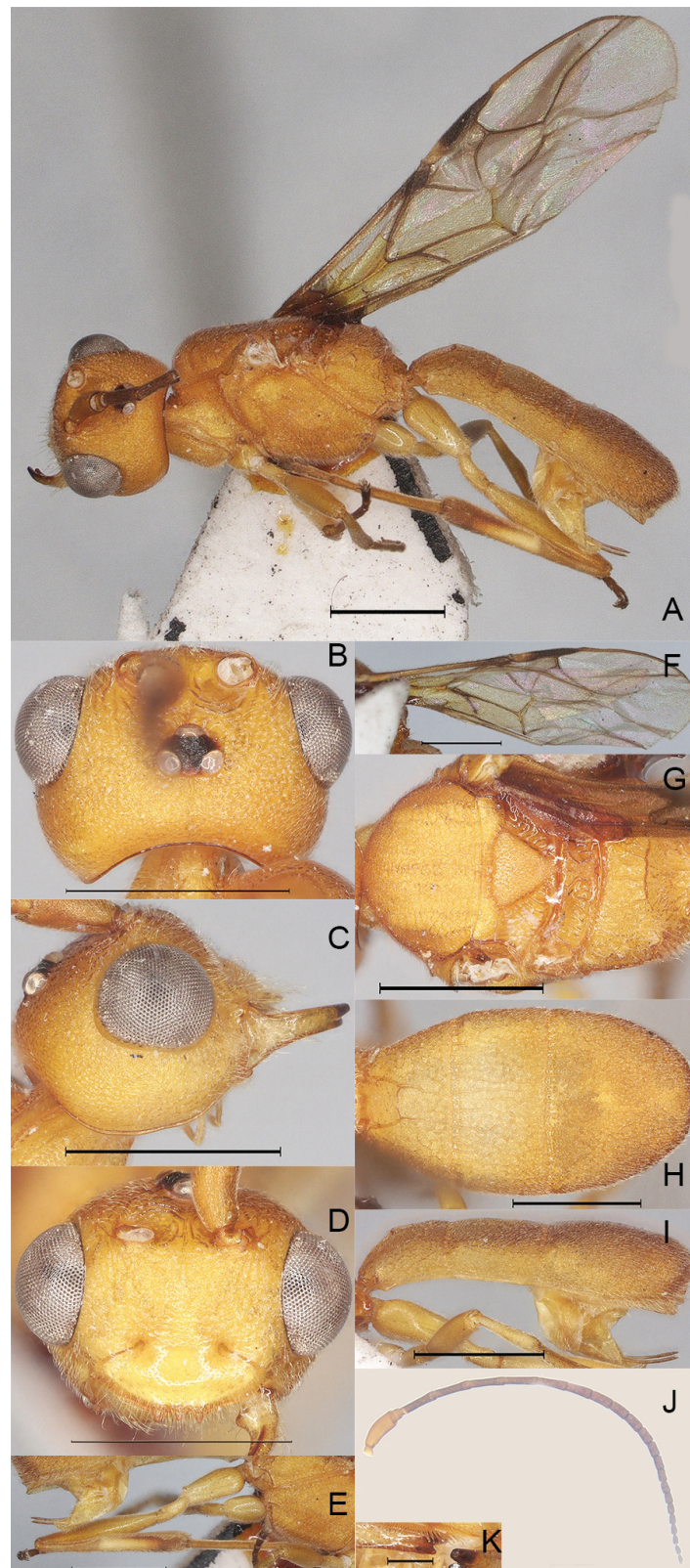


Fig. 3. *Phanerotoma aequidentata* sp. nov., holotype, ♀ (ZJUH No. 200611348). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Hind leg. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Antenna, lateral view. **K.** Mandible, ventral view. Scale bars: A–I = 1 mm; K = 0.2 mm (no scale bar for J).

densely rugose and rounded (Fig. 3H), lateral lamella wide, narrowly emarginated; ovipositor sheath narrow, with some long and erect setae; hypopygium apically acute and with up-curved short triangular protuberance (Fig. 3I).

Male

Unknown.

Host

Unknown.

Distribution

China (Yunnan).

Phanerotoma bicolor Sonan, 1932

Fig. 4

Phanerotoma bicolor Sonan, 1932: 81

Phanerotoma bicolor – Watanabe 1934: 198. — Sonan 1940: 372. — Zettel 1990a: 111.

Diagnosis

Hypopygium with slender, medium-sized triangular protuberance apically (Fig. 4F); vein 3-SR of fore wing twice as long as vein r (Fig. 4G); penultimate antennal segment $2\times$ as long as wide (Fig. 4K); clypeus with three robust but small teeth ventrally (Fig. 4E); angle between veins 2-SR and 3-SR of fore wing about 90° ; lower tooth of mandible small (Fig. 4L).

Type material

Holotype

CHINA – **Taiwan** • ♂; Koshun [= Kaohsiung]; 25 Apr.–25 May 1918; J. Sonan, K. Miyaki and M. Yoshino leg.; Taiwan Agricultural Research Institute.

Other material examined (1 ♂, 12 ♀♀)

CHINA – **Zhejiang** • 1 ♂; Lingan, Qingliang Peak; 4 Jul. 2008; Junhua He leg.; ZJUH No. 200805020 • 12 ♀♀; same data as for preceding; ZJUH Nos 200805008 to 200805019.

Host

Unknown.

Distribution

China (Zhejiang, Taiwan).

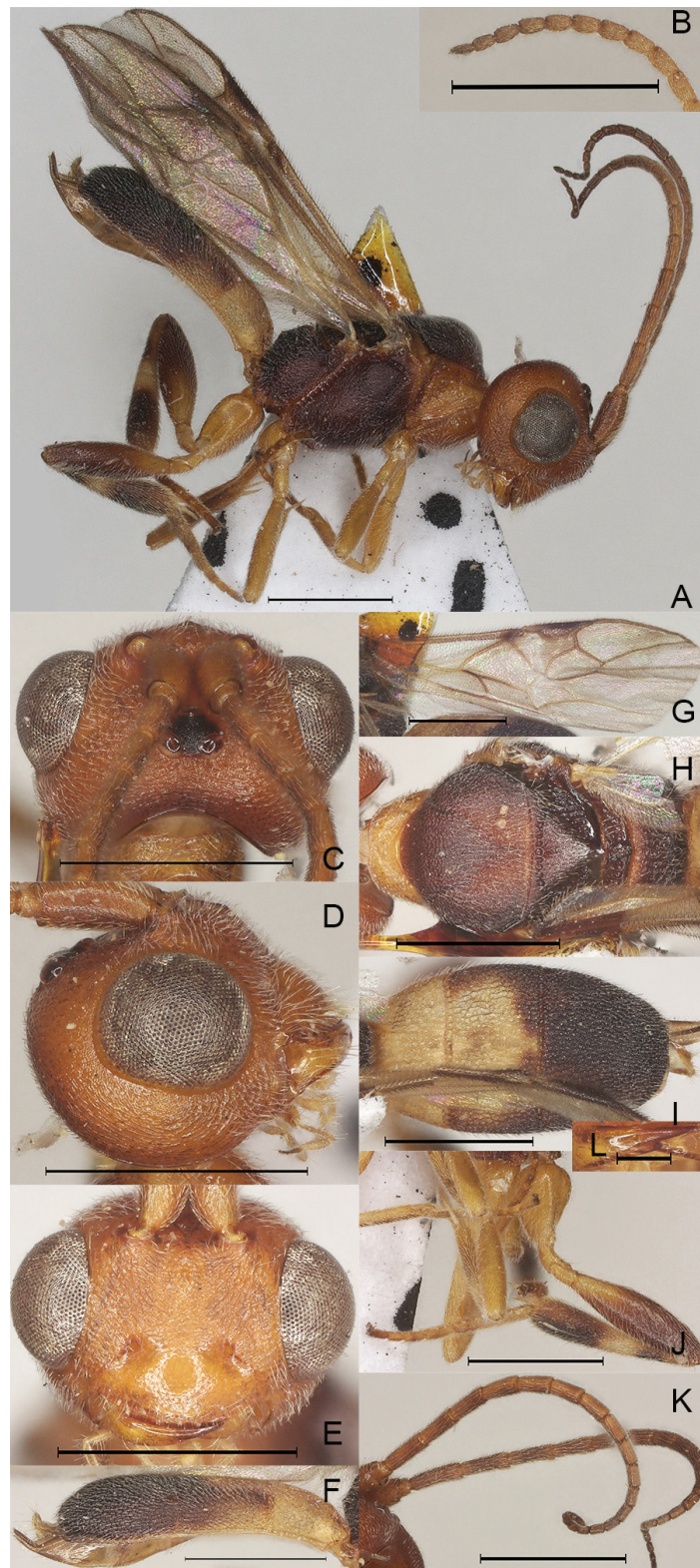


Fig. 4. *Phanerotoma bicolor* Sonan, 1932, China, Zhejiang. **A, C–L.** ♀ (ZJUH No. 200805102). **B.** ♂ (ZJUH No. 200805020). **A.** Habitus, lateral view. **B.** Apical antenna, lateral view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Metasoma, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Hind leg. **K.** Antenna, lateral view. **L.** Mandible, ventral view. Scale bars: A–K=1 mm; L=0.2 mm.

Phanerotoma brunneivena van Achterberg, 2021

Fig. 5

Phanerotoma brunneivena van Achterberg, 2021: 26–30.

Diagnosis

Third tergite of metasoma $1.8\text{--}2.0\times$ as long as second tergite, distinctly concave medio-posteriorly in dorsal view (Fig. 5H); protuberance of hypopygium of ♀ slender and much longer than its basal width (Fig. 5E); ovipositor sheath needle-shaped (Fig. 5E); clypeus with three minute teeth medio-ventrally, partly hidden by conspicuous fringe of setae (Fig. 5D); head slightly emarginate medio-posteriorly (Fig. 5B); face coarsely rugose; penultimate segment $1.4\times$ as long as wide in lateral view (Fig. 5J); eye large, $1.7\times$ as long as temple in dorsal view.

Differential diagnosis

Similar to *P. acuminata* Szépligeti, 1908, a species reported from Korea and Far East Russia. However, this species has a short triangular prolongation of the female hypopygium (not longer than its basal width), parastigma dark brown, ovipositor sheath less needle-shaped and vein r of fore wing $0.2\text{--}0.3\times$ as long as vein 3-SR.

Type material

Holotype

UAE • ♀; Fujairah (1484); $25^{\circ}08' \text{ N}$, $56^{\circ}21' \text{ E}$; 19 Apr.–2 May 2005; A. v. Harten leg.; RMNH'06.

Other material examined (2 ♀♀)

CHINA – Zhejiang • 1 ♀; Qingyuan, Bai Mt., Zu; 31 Aug. 1993; Hong Wu leg.; ZJUH No. 945207 • 1 ♀; Anji, Longwang Mt.; 20 Sep. 2004; Belok leg.; ZJUH No. 20050028.

Host

Unknown.

Distribution

United Arab Emirates, Yemen, China (Zhejiang). China is a new record.

Phanerotoma conopomorphae Tsang, You & van Achterberg, 2011

Phanerotoma conopomorphae Tsang, You & van Achterberg, 2011: 53–58.

Diagnosis

Frons slightly convex and densely granulate; head in lateral view almost rounded dorsally and ocelli visible; apical antennal segments of female shorter than subapical segments; length of 1-R1 $1.3\times$ as long as pterostigma, vein 1-CU1 of fore wing $0.4\times$ as long as vein 2-CU1; lateral lamella of third tergite more or less serrate; hypopygium truncate apically.

Type material

Holotype

CHINA – Guangdong • ♀; Zhuhai; 22° N , 113° E ; 22 Aug. 2006; Winson Tsang leg.

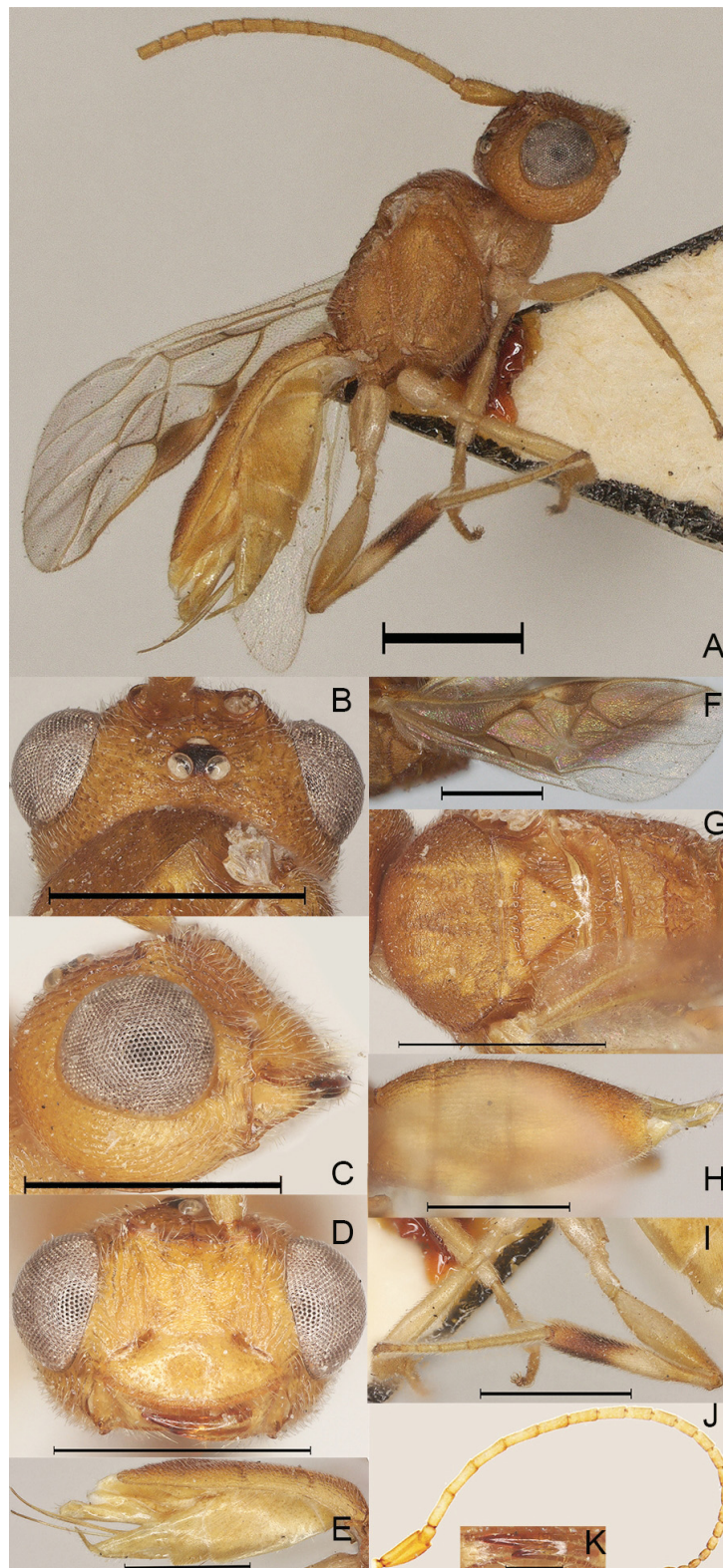


Fig. 5. *Phanerotoma brunneivena* van Achterberg, 2021 China, Zhejiang, ♀ (ZJUH No. 945207). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Metasoma, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Hind leg. **J.** Antenna, lateral view. **K.** Mandible, ventral view. Scale bars: A–I=1 mm; K=0.2 mm (no scale bar for J).

Host

Conopomorpha sinensis Bradley, 1986 (Gracillariidae) on *Litchi chinensis* Sonn.

Distribution

China (Guangdong).

Phanerotoma coronaria sp. nov.

urn:lsid:zoobank.org:act:E96DE646-05BE-48BF-BFA0-34544C83330E

Fig. 6

Diagnosis

Vein r of fore wing extremely short (Fig. 6E), vein 3-SR about $12\times$ as long as vein r; vein 1-CU1 of fore wing short (Fig. 6E); vein 1-M of fore wing yellowish; apical tooth of mandible comparatively slender (Fig. 6J); eye small and in lateral view $0.9\times$ as wide as temple (Fig. 6C); clypeus with three minute teeth (Fig. 6D); fore wing with brown patches (Fig. 6A); hind basitarsus white and strongly contrasting to dark brown hind tibia; vein 2-CU1 curved basally in holotype, but straight in paratype.

Etymology

Named after the protruding antennal sockets, from the Latin '*corona*' for 'crown'.

Type material

Holotype

CHINA – Yunnan • ♀; Ruili; 2 May 1981; Junhua He leg.; ZJUH No. 812417.

Paratypes (2 ♀♀)

CHINA – Guangxi Zhuangzu Zizhiqu • 1 ♀; Longzhou, Guangxi Zhuangzu Zizhiqu Nonggang National Reserve; 19 May 1982; Junhua He leg.; ZJUH No. 821538 • 1 ♀; same data as for preceding; SEMCAS 34025978.

Description

Female

MEASUREMENTS. Length of body 5.2 mm, of fore wing 4.8 mm.

COLOURATION. Head yellow but frons, vertex medially and stemmaticum dark brown; mesosoma yellow except lower lateral angle of prosternum, mesoscutum excluding notauli and scutellar sulcus dark brown, most of mesopleuron, metapleuron and mesosternum brown; metasoma brown; vein 1-M of wing yellow with veins 3-SR, 2-SR, 2-M, cu-a, 2-CU1 and 1-SR+M brown; legs yellow but coxa basally, middle and hind femur, and hind tibia brown.

HEAD. Width $1.3\times$ median length in anterior view (Fig. 6D) and part of head above eye in lateral view $0.3\times$ height of eye (Fig. 6C); antennae missing; OOL: diameter of posterior ocellus: POL=41:10:6; eye $1.1\times$ temple in dorsal view (Fig. 6B); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face obliquely rugose and with short median crest; clypeus mostly smooth, shiny and about as long as minimum width of face, intertentorial distance $2.9\times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 small and distinctly spaced teeth medio-ventrally (Fig. 6D); eye small and in lateral view $0.9\times$ as wide as temple (Fig. 5B), in anterior view its height $0.6\times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 6D); malar space $0.8\times$

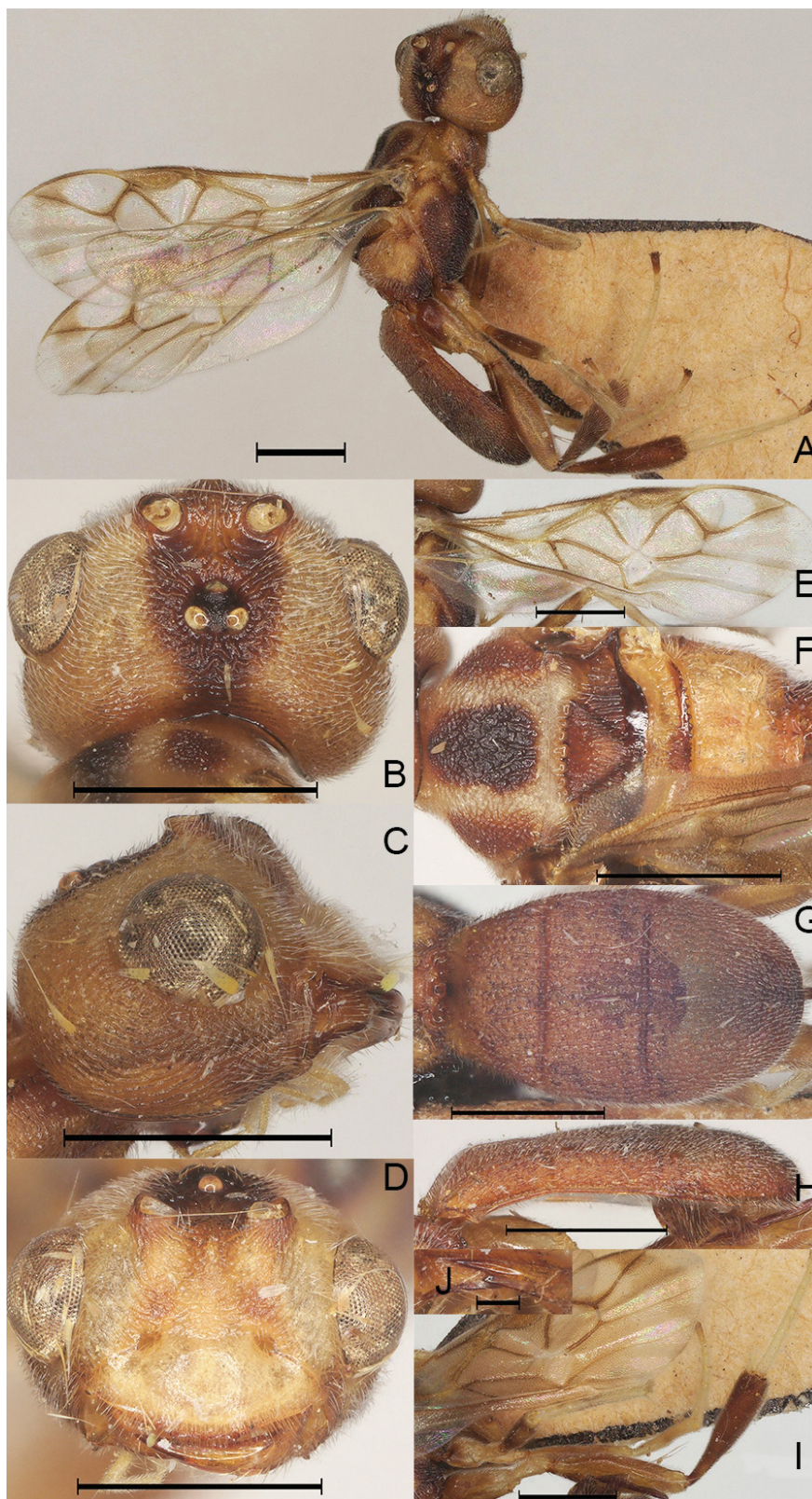


Fig. 6. *Phanerotoma coronaria* sp. nov., holotype, ♀ (ZJUH No. 812417). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Fore wing. **F.** Mesosoma, dorsal view. **G.** First third of metasomal tergites, dorsal view. **H.** Metasoma, lateral view. **I.** Hind leg. **J.** Mandible, ventral view. Scale bars: A–I = 1 mm; J = 0.2 mm.

as long as basal width of mandible; lower tooth of mandible very small, $0.2 \times$ length of apical tooth (Fig. 6K).

MESOSOMA (Fig. 6F). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide and with six carinae (Fig. 6F); scutellum triangular, flat, distinctly longitudinally-granulate and rather shiny; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, latero-posteriorly distinctly tuberculate, no median or transverse carinae.

WINGS. Fore wing $2.8 \times$ as long as its maximum width; length of 1-R1 $1.4 \times$ as long as pterostigma; r issued rather far beyond middle of pterostigma and $0.2 \times$ 3-SR; distance between 1-R1 and wing apex $0.4 \times$ 1-R1; 2-SR nearly straight and converging to posterior margin of pterostigma (Fig. 6E); SR1 slightly bent; 2-SR+M present; parastigma small; 1-CU1 almost absent; r:3-SR:SR1=2:13:33; 2-SR:3-SR:r-m=25:13:8; 2-M straight apically and curved basally (Fig. 6E).

LEGS (Fig. 6I). Hind femur moderately wide and with satin sheen, $3.7 \times$ as long as wide and rather widened submedially; hind tibia rather swollen; middle tibia with medium-sized pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 6G–H). Carapace oval in dorsal view, $1.7 \times$ as long as wide and $1.1 \times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture wide; third tergite $1.7 \times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view convex medially, densely and semi-circularly rugose and rounded (Fig. 6G), lateral lamella narrow, medio-apically widely emarginate; ovipositor sheath narrow and parallel-sided (Fig. 6H), with some long and erect setae; hypopygium apically acute, lacking an up-curved triangle or apical spine (Fig. 6H).

VARIATION. Vein 2-CU1 curved basally in holotype but straight in paratype; third tergite $1.5\text{--}1.7 \times$ as long as second tergite.

Male

Unknown.

Host

Unknown.

Distribution

China (Yunnan, Guangxi Zhuangzu Zizhiqu).

Phanerotoma crassitibialis sp. nov.

urn:lsid:zoobank.org:act:5AE9232B-6E9D-471D-8381-18F6FF2E56C2

Fig. 7

Diagnosis

Vein r of fore wing angled with vein 3-SR (Fig. 7F); subapical segments of ♀ antenna widened medially (Fig. 7E); vein 2-M of fore wing infusate (Fig. 7F); vein 1-M robust apically (Fig. 7F); apical half of hind femur yellowish brown (Fig. 7I); third metasomal tergite about $1.4 \times$ as long as second tergite (Fig. 7H); first discal cell of fore wing more transverse and less robust (Fig. 7F); vein r of fore wing somewhat wider than vein 3-SR.

Etymology

Named after the rather swollen hind tibia, from the Latin ‘*crassus*’ for ‘thick’ and ‘*tibia*’ for part of a leg.

Type material

Holotype

CHINA – Hainan • ♀; Jianfengling Mt.; 4–7 Jun. 2007; Jie Zeng leg.; ZJUH No. 200711163.

Description

Female

MEASUREMENTS. Length of body 3.7 mm, of fore wing 3.3 mm.

COLOURATION. Yellow; stemmaticum, teeth of mandible, tegula and propodeum basally dark brown; first and second tergites medially, legs except hind femur and tibia, and tarsus apically, yellow, hypopygium ivory.

HEAD. Width $1.5\times$ median length in anterior view (Fig. 7D) and part of head above eye in lateral view $0.2\times$ height of eye (Fig. 7C); antenna with 23 segments and $1.4\times$ as long as fore wing, subapical antennal segments not moniliform (Fig. 7E), fourth, third and penultimate segments 2.2 , 2.9 and $2.8\times$ as long as wide in lateral view; area of stemmaticum mainly granulate; OOL: diameter of posterior ocellus: POL = $22:7:4$; eye $1.8\times$ as long as temple in dorsal view (Fig. 7B); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face obliquely rugose and without median carina; clypeus mostly smooth, shiny and $0.7\times$ minimum width of face, intertentorial distance $1.6\times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 small and close teeth medio-ventrally (Fig. 7D); eye large and in lateral view $1.6\times$ as wide as temple (Fig. 7C), in anterior view its height $0.7\times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 7D); malar space $0.9\times$ as long as basal width of mandible; lower tooth of mandible very robust and $0.8\times$ length of apical tooth (Fig. 7K).

MESOSOMA (Fig. 7G). Length $1.7\times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide and with seven carinae (Fig. 7G); scutellum triangular, flat, distinctly granulate-rugose and rather shiny; metanotum without short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, no transverse or median carinae, latero-posteriorly tuberculate.

WINGS. Fore wing $3.2\times$ as long as its maximum width; 1-R1 $1.4\times$ as long as pterostigma; r issued rather far beyond middle of pterostigma and almost as long as 3-SR; distance between 1-R1 and wing apex $0.4\times$ 1-R1; 2-SR straight (Fig. 7F); SR1 straight; 2-SR+M present; parastigma small; 1-CU1 $0.4\times$ as long as vein 2-CU1, cu-a oblique and $0.7\times$ as long as 1-CU1; r: 3-SR: SR1 = $1:1:6$; 2-SR: 3-SR: r-m = $2:1:1$; 2-M straight apically and curved basally (Fig. 7F).

LEGS (Fig. 7J). Hind femur moderately wide and with satin sheen, $4.8\times$ as long as wide and rather widened submedially; hind tibia rather swollen; middle tibia with medium-sized ivory blister; hind coxa smooth and shiny.

METASOMA (Fig. 7H–I). Carapace elliptical in dorsal view, $1.7\times$ as long as wide and $2.0\times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture wide; third tergite $1.4\times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view convex medially, densely longitudinally rugose and rounded (Fig. 7H), lateral

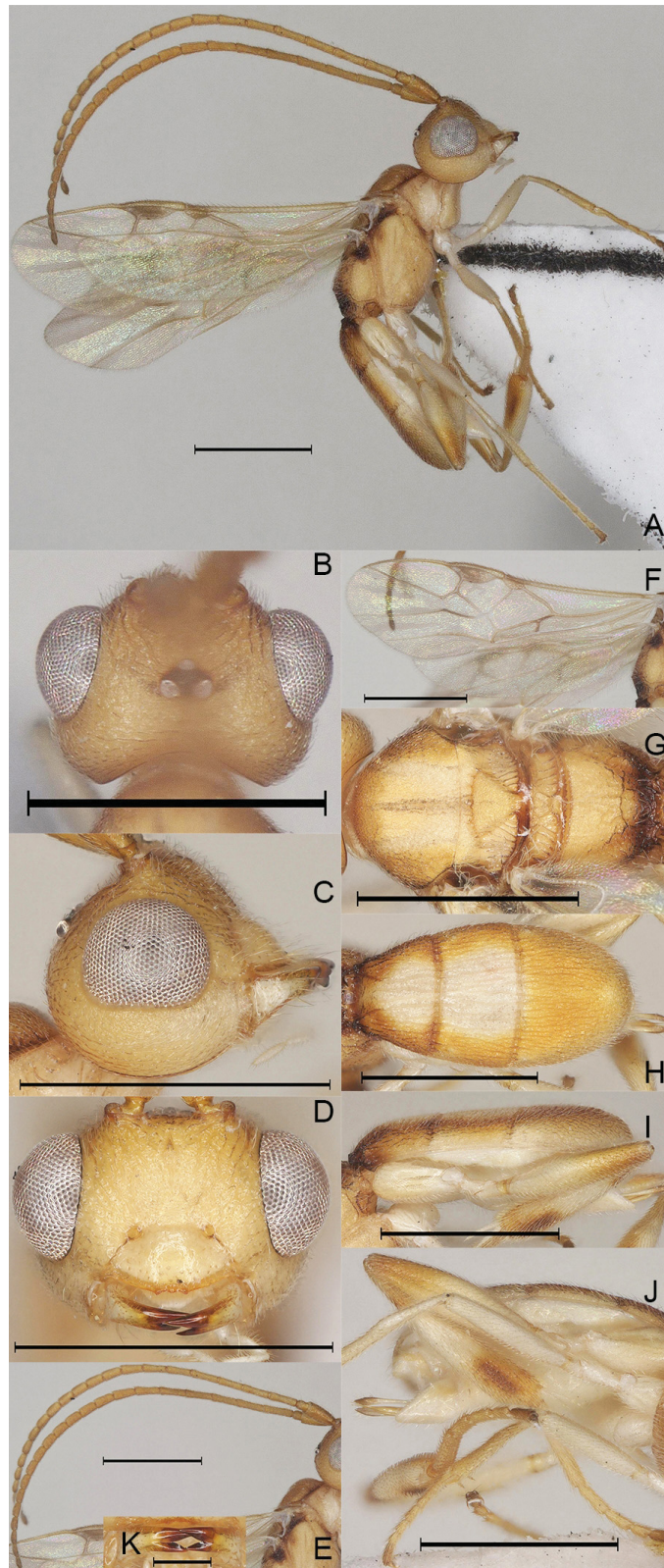


Fig. 7. *Phanerotoma crassitibialis* sp. nov., holotype, ♀ (ZJUH No. 200711163). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

lamella narrow, medio-apically truncate; ovipositor sheath narrow and parallel-sided (Fig. 7I), with some long and erect setae; hypopygium apically acute, lacking an up-curved triangle or apical spine (Fig. 7I).

Male

Unknown.

Host

Unknown.

Distribution

China (Hainan).

***Phanerotoma diversa* (Walker, 1874)**

Chelonus diversus Walker, 1874: 308.

Phanerotoma picta Snoflák, 1951: 24–26.

Phanerotoma diversus Shenefelt, 1973: 924 (as synonym of *P. planifrons*).

Phanerotoma picta – Shenefelt 1973: 923–924. — Zettel 1987: 365.

Diagnosis

Head and mesosoma largely dark brown or blackish; POL as long as diameter of posterior ocellus; maximum width of pterostigma about $0.9 \times$ vein 3-SR; apical half of middle tibia yellow; antenna brown; second tergite laterally dark brown; apical lamella of carapace medially about half as long as 4th segment of hind tarsus; lower tooth of mandible somewhat diverging from apical tooth; ocelli medium-sized; scutellum black or dark brown.

Type material

Holotype

CZECH REPUBLIC • ♀; Moravia, Javorník; BMNH.

Hosts

Acrobasis cymindella Ragonot, 1893 (Pyralidae) and *Conobathra fraukella* Roesler, 1975 (Pyralidae).

Distribution

Austria, Czech Republic, Italy, Japan, Mongolia, Russia, Spain, U.S.A., China (Taiwan).

***Phanerotoma duae* sp. nov.**

urn:lsid:zoobank.org:act:31B09370-20F4-4BA4-8A4A-0D47485F867C

Fig. 8

Diagnosis

Clypeus with three minute teeth medio-ventrally (Fig. 8D); hind tibia with yellowish brown patch basally and apically (Fig. 8J); eye large and in lateral view $1.9 \times$ as wide as temple (Fig. 8C); second metasomal suture slightly sinuate; 6–8 subapical antennal segments of female modified (Fig. 8E); upper condyle of mandible almost approaching lower level of eyes; malar space $0.6 \times$ as long as basal width of mandible.

Etymology

Named after the renowned Chinese entomologist Prof. Yu-Zhou Du (Yangzhou University, Yangzhou).

Type material

Holotype

CHINA – Liaoning • ♀; Dalian; 16 Aug. 1994; Juxian Lou leg.; ZJUH No. 952376.

Description

Female

MEASUREMENTS. Length of body 5.6 mm, of fore wing 4.7 mm.

COLOURATION. Yellow; stemmaticum, teeth of mandible, pterostigma, parastigma, veins 1-CU1 and cu-a of fore wing dark brown; hind tibia with distinct yellow patch subbasally.

HEAD. Width $1.5\times$ median length in anterior view (Fig. 8D) and part of head above eye in lateral view $0.2\times$ height of eye (Fig. 8C); antenna with 23 segments and $1.4\times$ as long as fore wing, three subapical antennal segments not moniliform (Fig. 8E), and narrowed and elongate, third and penultimate segments 1.6 and $1.8\times$ as long as wide in lateral view; area of stemmaticum mainly granulate; OOL: diameter of posterior ocellus: POL = 32:13:7; eye $1.7\times$ temple in dorsal view (Fig. 8B); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face obliquely rugose and without median carina; clypeus punctate, shiny and $0.9\times$ minimum width of face, intertentorial distance $3.2\times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 small teeth medio-ventrally (Fig. 8D); eye large and in lateral view $1.9\times$ as wide as temple (Fig. 8C), in anterior view its height $0.9\times$ minimum width of face; upper condyle of mandible almost approaching lower level of eyes (Fig. 8D); malar space $0.6\times$ as long as basal width of mandible; lower tooth of mandible $0.2\times$ length of apical tooth, small and short (Fig. 8K).

MESOSOMA (Fig. 8G). Length $1.5\times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli slightly indicated; scutellar sulcus narrow (Fig. 8G); scutellum triangular, flat, distinctly granulate-rugose and rather shiny; metanotum without short median carina anteriorly and small tooth posteriorly; propodeum coarsely reticulate-rugose, without transverse carina or median carina, latero-posteriorly tuberculate.

WINGS. Fore wing $3.3\times$ as long as its maximum width; length of 1-R1 $1.4\times$ as long as pterostigma; $r\ 0.3\times$ 3-SR; distance between 1-R1 and wing apex $0.2\times$ 1-R1; 2-SR strongly curved (Fig. 8F); SR1 bent; 2-SR+M present; parastigma medium-sized; 1-CU1 $0.6\times$ as long as vein 2-CU1, cu-a oblique and $0.7\times$ as long as 1-CU1; $r:3\text{-SR}:SR1=12:35:95$; $2\text{-SR}:3\text{-SR}:r\text{-m}=46:35:10$; 2-M bent apically and curved basally (Fig. 8F).

LEGS (Fig. 8J). Hind femur moderately wide and with satin sheen, $3.0\times$ as long as wide and rather widened submedially; hind tibia rather swollen; middle tibia with large yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 8H–I). Carapace elliptical in dorsal view, $1.7\times$ as long as wide and $1.2\times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture wide; third tergite $1.6\times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view truncate medially, densely and semi-circularly rugose (Fig. 8H), lateral lamella narrow, medio-apically weakly emarginate; ovipositor sheath robust and long (Fig. 8I), with some long and erect setae; hypopygium apically acute, lacking an up-curved triangle or apical spine (Fig. 8I).

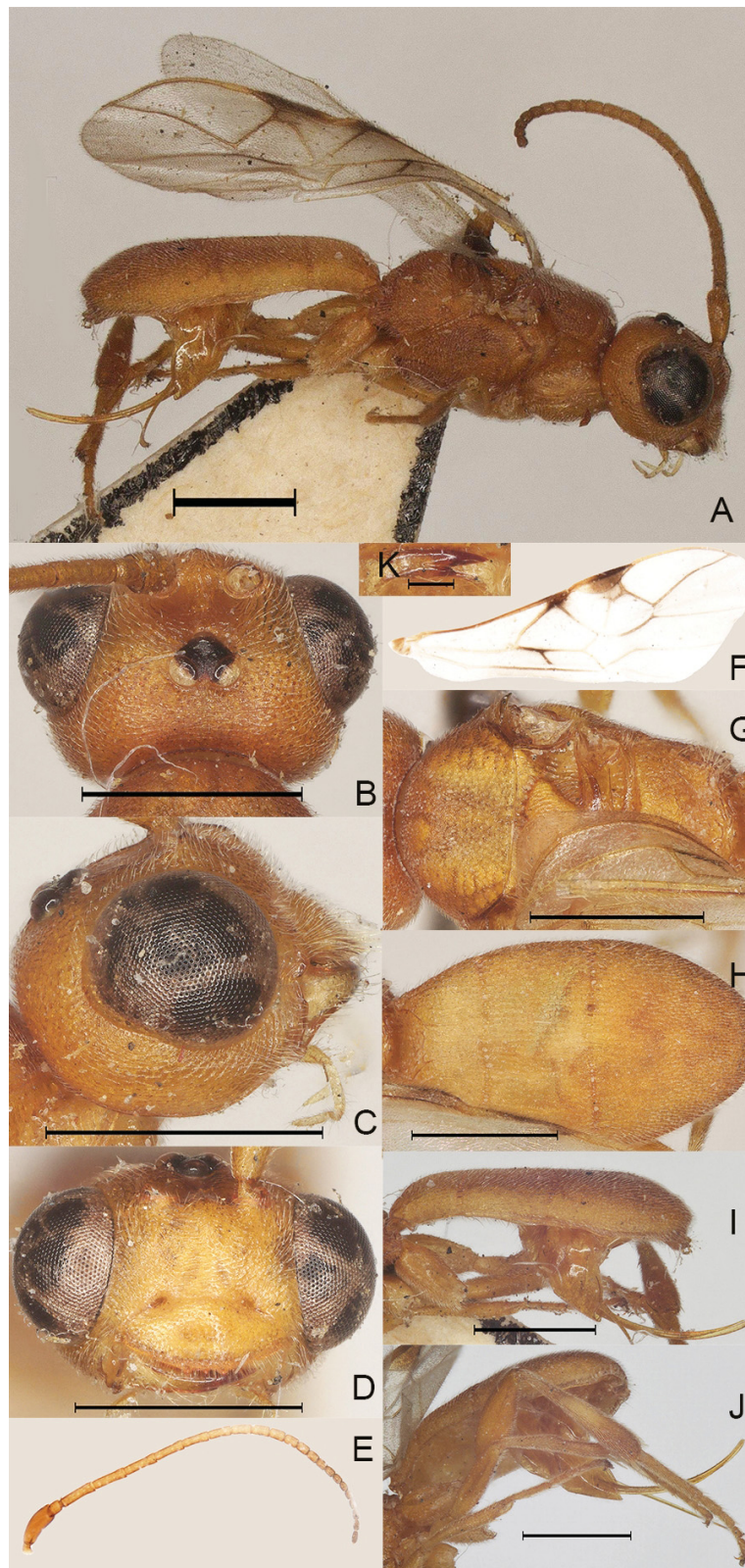


Fig. 8. *Phanerotoma duae* sp. nov., holotype, ♀ (ZJUH No. 952376). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J = 1 mm; K = 0.2 mm (no scale bar for E).

Male

Unknown.

Host

Unknown.

Distribution

China (Liaoning).

Phanerotoma emeishanensis sp. nov.

urn:lsid:zoobank.org:act:B4D4DCDA-AD47-4CA4-8ADE-E6EA59714438

Fig. 9

Diagnosis

Ninth segment of female antenna (as following segments) widened and about as long as wide, scapus and 9th–23rd segments of antenna dark brown, gradually narrowed and slender, and 2nd–8th segments of antenna yellow (Fig. 9J); third tergite of metasoma slightly and indistinctly emarginate medio-posteriorly; apical lamella of carapace medially about as wide as length of fourth hind tarsal segment; face mostly, frons and temple dark brown (Fig. 9B); metasomal carapace ovoid in dorsal view (Fig. 9H); hind basitarsus whitish.

Etymology

Named after the collection site (Emei Mt.).

Type material

Holotype

CHINA – Sichuan • ♀; Emei Mt.; 1–3 Aug. 2006; Hongying Zhang leg.; ZJUH No. 200611279.

Description

Female

MEASUREMENTS. Length of body 4.4 mm, of fore wing 3.8 mm.

COLOURATION. Yellow; stemmaticum, frons, temple basally in dorsal view, first and 9th–23rd segments of antenna, face medially, teeth of mandible, mesoscutum (except M-shaped area), metanotum medially, propodeum largely, first and second tergite laterally, third tergite largely, hind femur and tibia apically, pterostigma and parastigma dark brown.

HEAD. Width $1.3 \times$ median length in anterior view (Fig. 9D) and part of head above eye in lateral view $0.4 \times$ height of eye (Fig. 9C); antenna with 23 segments and as long as fore wing, subapical antennal segments not moniliform (Fig. 9J), and 9th segment widest, 3rd–8th segments slender, 9th–23rd segments shortened and swollen; area of stemmaticum mainly granulate; OOL : diameter of posterior ocellus : POL = 31 : 11 : 7; eye $1.4 \times$ temple in dorsal view (Fig. 9B); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face obliquely rugose and without median carina; clypeus smooth, shiny and $0.9 \times$ as long as minimum width of face, intertentorial distance $3.2 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 minute teeth medio-ventrally (Fig. 9D); temple wide and in lateral view $1.3 \times$ as wide as temple (Fig. 9C), in anterior view its height $0.7 \times$ minimum width of face; upper condyle of

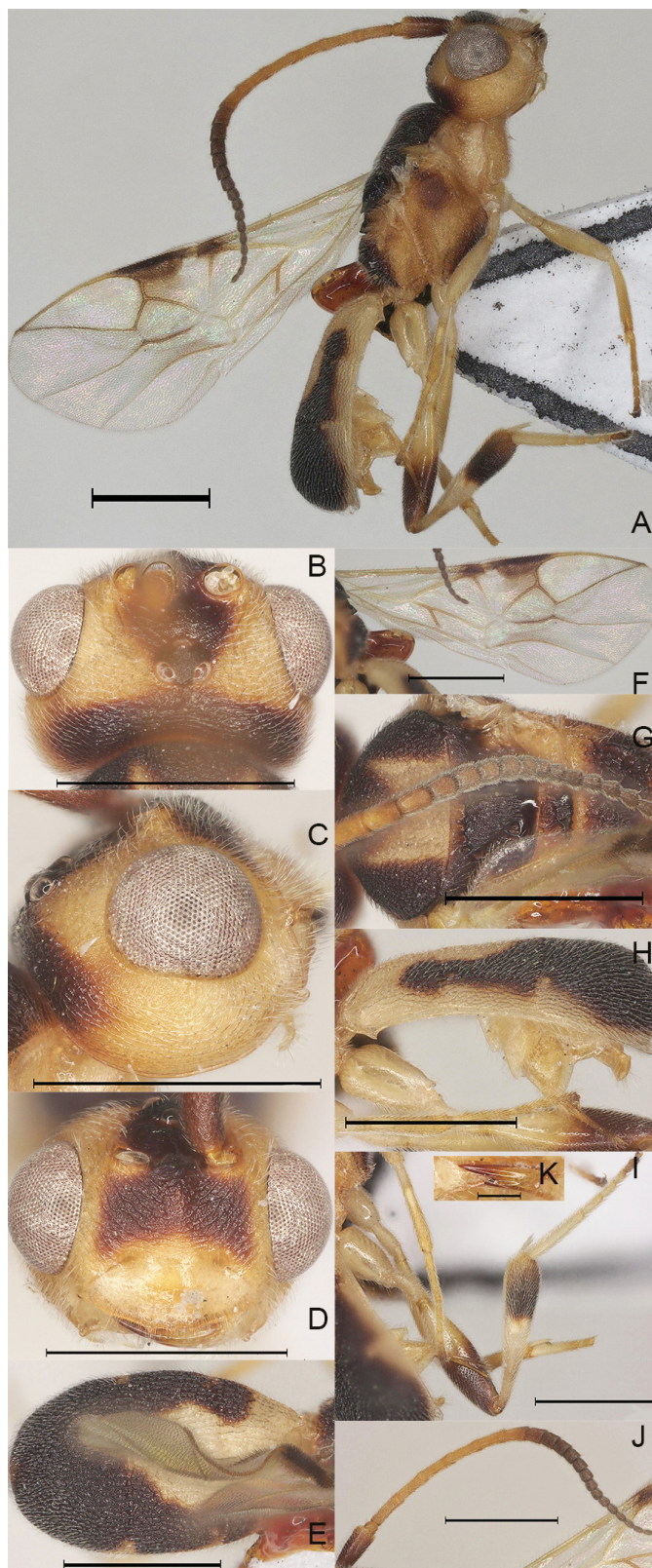


Fig. 9. *Phanerotoma emeishanensis* sp. nov., holotype, ♀ (ZJUH No. 200611279). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** First third of metasomal tergites, dorsal view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** Metasoma, lateral view. **I.** Hind leg. **J.** Antenna, lateral view. **K.** Mandible, ventral view. Scale bars: A–J = 1 mm; K = 0.2 mm.

mandible far below lower level of eyes (Fig. 9D); malar space $0.9 \times$ as long as basal width of mandible; lower tooth of mandible $0.2 \times$ length of apical tooth, small and short (Fig. 9K).

MESOSOMA (Fig. 9G). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 9G); scutellum triangular, flat, distinctly granulate-rugose and rather shiny; metanotum without short median carina anteriorly and small tooth posteriorly; propodeum coarsely reticulate-rugose, without transverse or median carina, latero-posteriorly tuberculate.

WINGS. Fore wing $2.6 \times$ as long as its maximum width; length of 1-R1 $1.3 \times$ as long as pterostigma; r issued rather far beyond middle of pterostigma and $0.6 \times$ 3-SR; distance between 1-R1 and wing apex $0.4 \times$ 1-R1; 2-SR and SR1 nearly straight (Fig. 9F); 2-SR+M present; parastigma medium-sized; 1-CU1 $0.3 \times$ as long as vein 2-CU1, cu-a oblique and $1.2 \times$ as long as 1-CU1; r:3-SR:SR1=4:7:24; 2-SR:3-SR:r-m=13:7:3; 2-M slightly bent (Fig. 9F).

LEGS (Fig. 9I). Hind femur moderately wide and with satin sheen, $3.6 \times$ as long as wide and rather widened submedially; hind tibia rather swollen; middle tibia with large yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 9E, H). Carapace elliptical in dorsal view, $1.7 \times$ as long as wide and $1.2 \times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite $1.2 \times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view convex medially, densely and semi-circularly rugose and rounded (Fig. 9E), lateral lamella wide, medio-apically weakly emarginate; ovipositor sheath spine-like and medium (Fig. 9H), with some long and erect setae; hypopygium apically acute, lacking an up-curved triangle or apical spine (Fig. 9H).

Male

Unknown.

Host

Unknown.

Distribution

China (Sichuan).

Phanerotoma flava Ashmead, 1906

Fig. 10

Phanerotoma flava Ashmead, 1906: 191.

Phanenerotoma taiwana Sonan, 1932: 81.

Phanerotoma flava – Shenefelt 1973: 915. — Zettel 1990: 118. — Tobias 2000: 430. — Chen & Ji 2003: 169.

Diagnosis

Body comparatively large, length of body 6–9 mm; vein 1-CU1 of fore wing about as long as vein 2-CU1 or distinctly longer (Fig. 10F); flagellum of antenna gradually more slender and narrowed apically (Fig. 10E); metanotum with complete median carina (Fig. 10G); malar space about as long as basal

width of mandible; head weakly emarginate medio-posteriorly (Fig. 10B); eyes strongly protruding; vein 1-M of fore wing yellow.

Type material

Holotype

JAPAN • ♀; Tokyo; 27 Aug. 1913; S. Hirayama leg.; US National Museum of Natural History.

Other material examined (63 ♀♀, 33 ♂♂)

CHINA – **Zhejiang** • 2 ♀♀; Hangzhou; 23 Jun. 1931; Ruzuo Zhu leg.; ZJUH • 1 ♀, 2 ♂♂; same data as for preceding; 10–23 Jun. 1931; Ruzuo Zhu leg.; ZJUH • 1 ♀; same data as for preceding; 31 May 1956; Ruzuo Zhu leg.; ZJUH No. 65025.10 • 1 ♀; same data as for preceding; 6 Jun. 1956; Junhua He leg.; ZJUH No. 5626.5 • 1 ♀, 1 ♂; same data as for preceding; 14–16 Jun. 1957; Zhengnan Zhou and Cui Hu leg.; ZJUH Nos 5702.20, 5778.3 • 1 ♀; same data as for preceding; May 1962; ZJUH No. 800133 • 3 ♀♀, 2 ♂♂; same data as for preceding; Jul. 1965; ZJUH • 1 ♀; same data as for preceding; Jun. 1986; Benyue Zhang leg.; ZJUH No. 864527 • 1 ♀; same data as for preceding; 12 Jun. 1987; Yun Ma leg.; ZJUH No. 870942 • 2 ♀♀; same data as for preceding; Jun. 1992; Xiujuan Shen and Nan Zheng leg.; ZJUH • 1 ♂; Tianmu Mt.; 20 Jun. 1996; Xuexin Chen leg.; ZJUH No. 972197 • 4 ♂♂; same data as for preceding; 30 Jun.–23 Aug. 1998; Yun Ma, Mingshui Zhao and Yafang Yang leg.; ZJUH Nos 994249, 994659, 20000975, 20001950 • 7 ♀♀; same data as for preceding; ZJUH Nos 993256, 999142, 20000821, 20002961, 20003597, 20003598, 200010880 • 1 ♂; Xiao Mt.; 2 Jul. 1975; ZJUH • 1 ♀; Fuyang; 2 Aug. 1984; Jingqian Cao leg.; ZJUH No. 850062 • 1 ♀; Jiande; 28 May 1983; Qihu Chen leg.; ZJUH No. 840316 • 1 ♀, 2 ♂♂; Chunan; Lao Mt.; 28 Jun. 2004; Tangxing Wang leg.; ZJUH • 1 ♀; Linan, Qingliangfeng Mt.; 7 Aug. 2005; Hongying Zhang leg.; ZJUH No. 200603201 • 1 ♀; Mogan Mt.; 16 Jul. 1981; Hong Wu leg.; ZJUH No. 915905 • 1 ♀; Deqing, Fatou; 13 May 1993; Junhua He leg.; ZJUH No. 980987 • 1 ♀; Changxing; 9 Aug. 1977; Zheng Xu leg.; ZJUH No. 771136 • 1 ♀; Cixi; Oct. 1964; Qihu Chen leg.; ZJUH No. 64061.5 • 1 ♀; Taizhou; 9 Jun. 1935; Ruzuo Zhu leg.; ZJUH • 1 ♂; Suichang; 20 Sep. 1990; Hanlin Chen leg.; ZJUH No. 907824 • 1 ♀; Jinyun; Jul. 1983; Sichun Li leg.; ZJUH No. 835439 • 1 ♀; Lishui; 30 Jun. 1984; Kunyan Zhu leg.; ZJUH No. 842724 • 1 ♀; Songyang; 30 Jul. 1985; Hanlin Chen leg.; ZJUH No. 853334 • 1 ♀; Wuyanling Nature Reserve; 31 Jul. 1983; Zhenbing Cai leg.; ZJUH No. 833344. – **Liaoning** • 1 ♂; Dabeigou village; 6 Jul. 1974; ZJUH No. 772211 • 2 ♀♀; Yingkou; 21 Jul. 1980; Jingke Li leg.; ZJUH No. 816253. – **Henan** • 1 ♂; Xinxiang; 4 Jun. 1981; Chengzhong Xu leg.; ZJUH No. 815701 • 1 ♂; Neixiang; 11 Jul. 1998; Xuexin Chen leg.; ZJUH No. 985962 • 1 ♀; Songxian; Baiyun Mt.; 17 Aug. 2008; Jingxian Liu leg.; ZJUH No. 200801267. – **Shaanxi** • 1 ♀; Foping; Cuizhu Garden; 33°31' N, 107°59' E; elev. 836 m; 25 Aug. 2013; Bingbing Xu leg.; ZJUH No. 201300405LT • 1 ♀; Yangling; 25 Jun. 1984; ZJUH No. 200800256 • 1 ♀; Niubeiliang N.N.R.; 33.80° N, 108.79° E; elev. 1758 m; 10 Aug. 2013; Bingbing Tu leg.; ZJUH No. 201300210. – **Gansu** • 3 ♂♂; Chenxian; Feilong Gorge Scenic Area; elev. 1020 m; 4 Jul. 1999; Jian Yao and Tongli He leg.; ZJUH Nos 200104739, 200104143, 200104744 • 3 ♀♀; same data as for preceding; ZJUH Nos 200104740 to 200104742. – **Shanghai** • 1 ♀, 1 ♂; 18 Aug. 1981; ZJUH • 3 ♀♀, 1 ♂; 1982; Qinong Sun leg.; ZJUH – **Anhui** • 1 ♀; Yuexi; 9 Jun. 1981; Fuan Yang leg.; ZJUH No. 820573. – **Hubei** • 1 ♀; Wuchang; 9 Aug. 1974; ZJUH No. 750027 • 3 ♀♀; Zhuxi; 27–28 Aug. 1982; Junhua He; ZJUH Nos 824779, 824795, 833267. – **Hunan** • 2 ♂♂; Changsha; 29 Jul. 1977; Xinwang Tong leg.; ZJUH Nos 20044234, 20044862 • 1 ♀; same data as for preceding; 1 Jun. 1984; Mingde Han leg.; ZJUH No. 846554. – **Sichuan** • 1 ♂; Nanchong; 1943; Ruzuo Zhu leg.; ZJUH No. 65024.7 • 1 ♀; Emei Mt.; 1–3 Aug. 2006; ZJUH No. 200611280. – **Fujian** • 1 ♀, 1 ♂; Laizhou; 22 Aug. 1981; Yunlan Lin leg.; ZJUH • 1 ♂; same data as for preceding; 2–9 Sep. 1981; Yunlan Lin leg.; ZJUH No. 853549a • 3 ♀♀; same data as for preceding; ZJUH Nos 853546, 853547, 853549b • 1 ♂; Meihua Mt.; elev. 1100 m; 20 Jul. 1988; Jinjiang Fan leg.; ZJUH No. 886140 • 1 ♀; Wuyi Mt.; 14 Jul. 1994; Xuexin Chen leg.; ZJUH No. 942147 • 1 ♀; Yongtai; 17 Sep. 2002; Changming Liu leg.; ZJUH No.

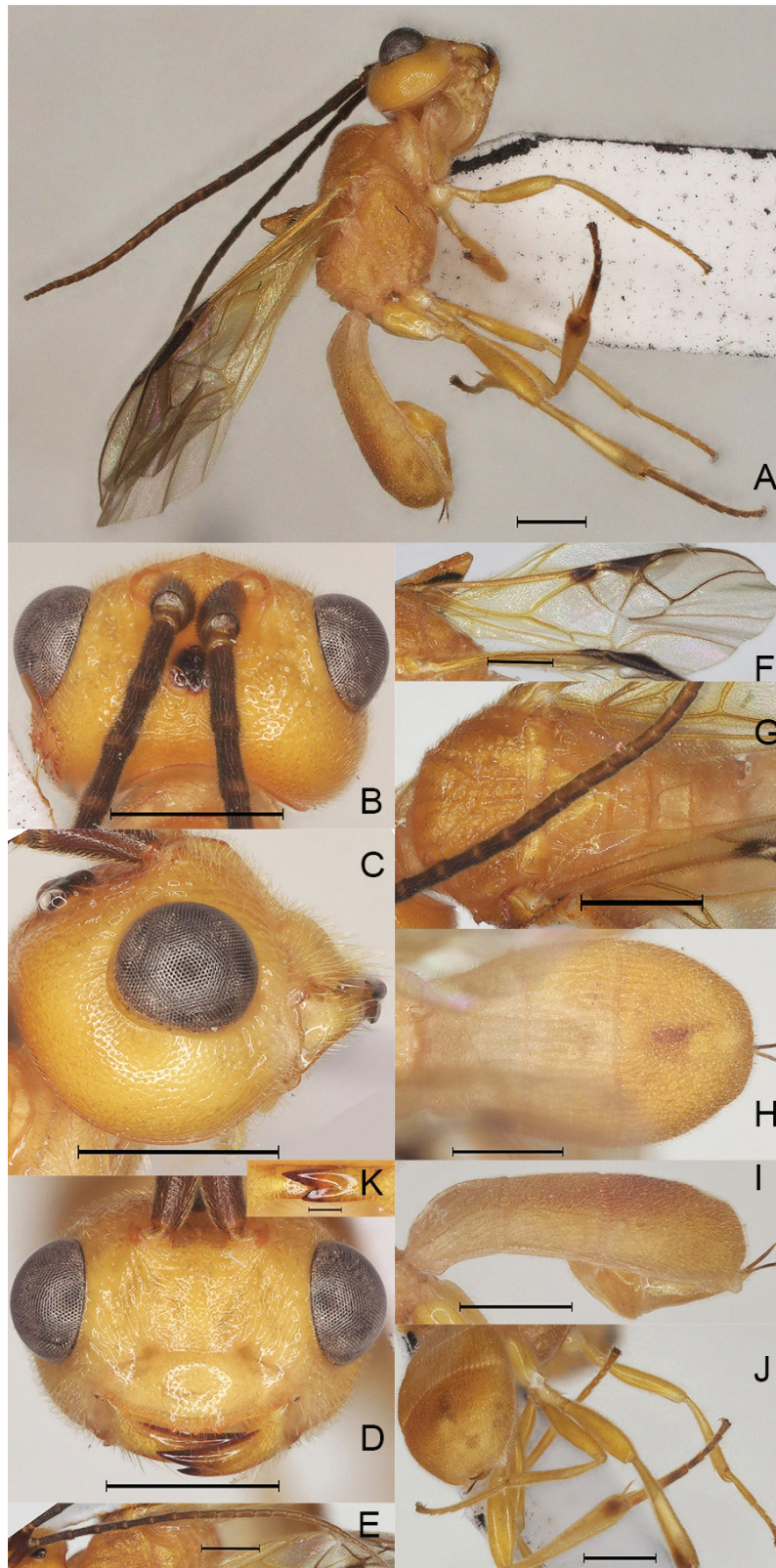


Fig. 10. *Phanerotoma flava* Ashmead, 1906, China, Shaanxi, ♀ (ZJUH No. 201300210). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

20023593. – **Guangdong** • 2 ♂♂; Conghua; Liuxi River; 15–21 Jun. 2001; Zaifu Xu leg.; ZJUH Nos 200107172, 200107218 • 5 ♀♀; Xinfeng; Jul. 1983; Shoujian Chen leg.; ZJUH Nos 896732, 896735, 896737, 896739, 896740 • 1 ♀; Ruyuan; Nan Mts; 25 Jul. 2003; Zaifu Xu leg.; ZJUH No. 20045200 • 1 ♀; same data as for preceding; 9–18 Jul. 2005; Yali Cai leg.; ZJUH No. 200609632. – **Hainan** • 1 ♂; Wuzhi Mt.; 16 May 2007; Jie Zeng leg.; ZJUH No. 200705095. – **Guangxi Zhuangzu Zizhiqu** • 1 ♂; Fangchenggang; elev. 2300 m; 8 Jun. 2000; Hong Wu leg.; ZJUH No. 200100225 • 1 ♀; Jinxiu; elev. 480 m; 1 Jul. 2000; Jun Chen leg.; ZJUH No. 200105110 • 1 ♀; Gongbeilao Mt.; elev. 1100–1600 m; 27 Aug. 2001; Guofang Jiang leg.; ZJUH No. 200201375 • 1 ♀; Shiwanda Mt.; Jul. 2003; Yiping Wang leg.; ZJUH No. 20041492. – **Guizhou** • 1 ♂; Fanjing Mt.; elev. 1000 m; 4 Aug. 2001; Yun Ma leg.; ZJUH No. 200108645 • 1 ♀; Chishui; 22 Sep. 2000; Ma Yun leg.; ZJUH No. 200103101. – **Beijing** • 1 ♀; Badaling; 1 Aug. 1957; IZCAS IOZ(E) 2059950.

Hosts

Pectinophora gossypiella Saunders, 1871 (Gelechiidae), *Locastra muscosalis* Walker, 1865 (Pyralidae) and *Orthaga achatina* Butler, 1878 (Pyralidae)

Distribution

Japan, Korea, Malaysia, Nepal, Philippines, Vietnam, China (Zhejiang, Shaanxi, Shanghai, Henan, Guangdong, Guangxi Zhuangzu Zizhiqu, Fujian, Hainan, Liaoning, Gansu, Guizhou, Sichuan, Hunan, Hubei, Anhui, Beijing).

Phanerotoma flavicephala sp. nov.

urn:lsid:zoobank.org:act:D1FC7467-6EE8-40D4-B96F-F4A5F20B3830

Fig. 11

Diagnosis

Apical half of vein 1-M of fore wing dark brown and basal half yellow (Fig. 11F); face granulate-rugose, with median bump (Fig. 11D); mesoscutum and scutellum coarsely rugose (Fig. 11G); pterostigma large (Fig. 11F); apical tooth of mandible rather slender (Fig. 11F); hypopygium apically acute, with up-curved short triangular protuberance (Fig. 11E).

Etymology

Named after the yellow head, from the Latin ‘*flavus*’ for ‘yellow’ and ‘*caput*’ for ‘head’.

Type material

Holotype

CHINA – **Zhejiang** • ♀; Tianmu Mo Mt.; 20 Jul. 1998; Mingyong Zhao leg.; ZJUH No. 20000903.

Description

Female

MEASUREMENTS. Length of body 4.1 mm, of fore wing 3.5 mm.

COLOURATION. Yellow; stemmaticum, tegula, pterostigma and vein 1-M apically, veins 1-CU1 and cu-a of fore wing, second tergite laterally, third tergite, hind femur and tibia apically dark brown; scapus, frons, teeth of mandible, veins r, 3-SR and 2-SR of fore wing brown.

HEAD. Width $1.5 \times$ median length in anterior view (Fig. 11D) and part of head above eye in lateral view $0.2 \times$ height of eye (Fig. 11C); antenna with 23 segments and $1.5 \times$ as long as fore wing, five

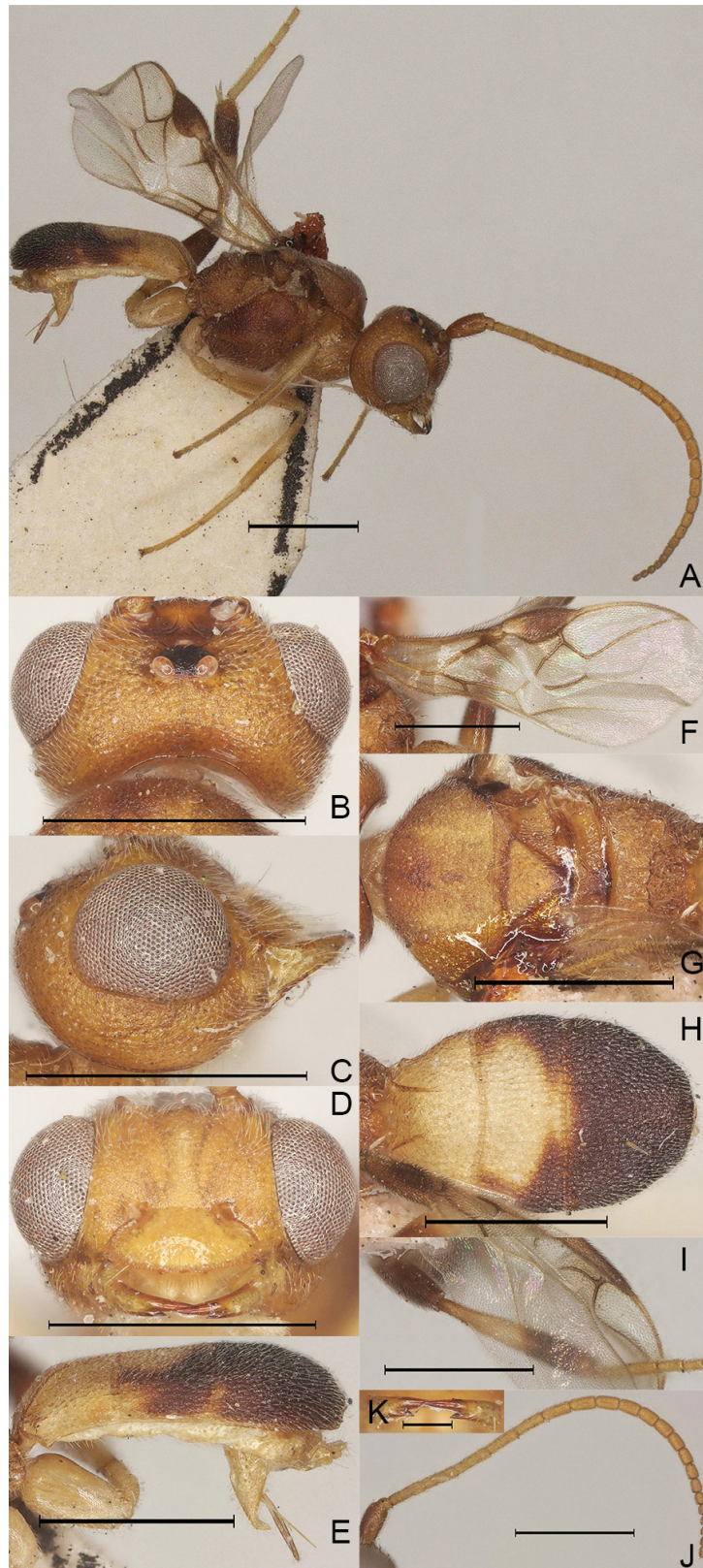


Fig. 11. *Phanerotoma flavicephala* sp. nov., holotype, ♀ (ZJUH No. 20000903). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Metasoma, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Hind leg. **J.** Antenna, lateral view. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

subapical antennal segments moniliform (Fig. 11J), antenna slender and gradually narrowed apically (Fig. 11A); third, fourth and penultimate segments 1.2, 1.3 and $1.3\times$ as long as wide in lateral view; area of stemmaticum mainly granulate; OOL: diameter of posterior ocellus:POL=10:10:27; eye $1.7\times$ temple in dorsal view (Fig. 11B); frons with longitudinal rugae medially, rugose laterally and with weakly median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face granulate-rugose and with median carina; clypeus smooth, shiny and $0.9\times$ minimum width of face, intertentorial distance $1.9\times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 indistinct teeth medio-ventrally (Fig. 11D); eye large and in lateral view $1.8\times$ as wide as temple (Fig. 11C), in anterior view its height $0.9\times$ minimum width of face; upper condyle of mandible close to lower level of eyes (Fig. 11D); malar space $0.4\times$ as long as basal width of mandible; lower tooth of mandible $0.2\times$ length of apical tooth, small and short (Fig. 11K).

MESOSOMA (Fig. 11G). Length $1.4\times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 11G); scutellum triangular, flat, distinctly granulate-rugose and rather shiny; metanotum without median carina or small tooth; propodeum coarsely reticulate-rugose, latero-posteriorly distinctly tuberculate, no transverse or median carinae.

WINGS. Fore wing $2.5\times$ as long as its maximum width; length of 1-R1 $1.4\times$ as long as pterostigma; r issued rather far beyond middle of pterostigma and $0.3\times$ 3-SR; distance between 1-R1 and wing apex $0.4\times$ 1-R1; 2-SR nearly straight (Fig. 11E); SR1 slightly bent; 2-SR+M present; pterostigma large, parastigma medium-sized; 1-CU1 $0.4\times$ as long as vein 2-CU1, cu-a oblique and $0.6\times$ as long as 1-CU1; r: 3-SR: SR1=6:19:66; 2-SR: 3-SR: r-m=30:19:13; 2-M slightly bent (Fig. 11E).

LEGS (Fig. 11I). Hind femur moderately wide and with satin sheen, $4.0\times$ as long as wide and rather widened submedially; hind tibia rather swollen (Fig. 11A); middle tibia with large pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 11E, H). Carapace elliptical in dorsal view, $1.6\times$ as long as wide and $1.2\times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite $1.6\times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view convex medially, densely and semi-circularly rugose and rounded (Fig. 11H), lateral lamella narrow, medio-apically with wide emargination; ovipositor sheath narrow (Fig. 11E), with some long and erect setae; hypopygium apically acute, with up-curved short triangular protuberance (Fig. 11E).

Male

Unknown.

Host

Unknown.

Distribution

China (Zhejiang).

***Phanerotoma formosana* Rohwer, 1934**

Fig. 12

Phanerotoma formosana Rohwer, 1934: 43–48.

Phanerotoma formosana – Fahringer 1937: 518. — Zettel 1990a: 119.

Diagnosis

Parastigma and first discal cell of fore wing anteriorly wide and with weakly curved vein 1-M (Fig. 12G); five subapical segments of antenna cylindrical, penultimate segment $2.3 \times$ as long as wide (Fig. 12E); vein cu-a of fore wing $0.7 \times$ as long as vein 1-CU1 (Fig. 12G); propodeum not tuberculate; OOL $3.0\text{--}4.1 \times$ maximum diameter of posterior ocellus (Fig. 12B); vein 1-R1 $1.3\text{--}1.4 \times$ as long as pterostigma; hypopygium of female with short triangular prolongation apically; lower tooth of mandible medium-sized (Fig. 12L); third tergite medially up to $1.9 \times$ as long as second tergite in dorsal view and less narrowed posteriorly (Fig. 12I); eye in lateral view about $1.7 \times$ as wide as temple (Fig. 12C); vein 2-CU1 of fore wing about twice as long as vein 1-CU1; mesosternum shiny and finely remotely punctate (Fig. 12H).

Type material

Holotype

CHINA – **Taiwan** • ♂; Taibei; Maki M. leg.; USNM ENT01569641.

Other material examined (45 ♀♀, 12 ♂♂)

CHINA – **Shanghai** • 1 ♀; 21 Aug. 1953; SEMCAS 34025975. – **Guangxi Zhuangzu Zizhiqu** • 1 ♀; Guilin; Maoer Mt.; 2–10 Aug. 2005; Bin Xiao leg.; ZJUH No. 200610102 • 1 ♀; Gunbeilao Mt.; elev. 1100–1600 m; 27 Aug. 2001; Guofang Jiang leg.; ZJUH No. 20021386 • 3 ♂♂; same data as for preceding; ZJUH Nos 20021385, 20021381, 20021387. – **Taiwan** • 4 ♀♀; Shouguang; 30 May 2011; Pu Tang leg.; ZJUH Nos 201105416, 201105420, 201105422, 202300114. – **Hainan** • 1 ♂; Ledong, Jianfeng; 7 May 2008; Jingxian Liu leg.; ZJUH No. 200800092 • 1 ♀; Jianfengling; 17–20 May 1983; Yalin Zhang leg.; ZJUH No. 200011972 • 1 ♀; Wuzhi Mt.; 16 May 2007; Jie Zeng leg.; ZJUH No. 200705126 • 1 ♀; Bangwangling; 17–19 Jul. 1997; Ping Cai leg.; ZJUH No. 975444. – **Zhejiang** • 1 ♀; Linhai; 6 Aug. 1965; Junhua He and Dengdi Jin leg.; ZJUH ZJUH No. 65062.11 • 1 ♂; Qingyuan; 16 Jul. 1994; Hong Wu leg.; ZJUH No. 946505 • 1 ♀; Hangzhou; 14 Jun. 1957; Cui Hu leg.; ZJUH No. 5776.2. – **Yunnan** • 3 ♀♀; Leyou Mt.; 17 Apr. 1981; Junhua He leg.; ZJUH Nos 790604, 800856, 811732. – **Fujian** • 1 ♂; Wuyi Mt.; 14 Jul. 1994; Xuexin Chen leg.; ZJUH No. 942188. – **Guizhou** • 1 ♀; Fanjing Mt.; elev. 1300 m; 2 Aug. 2001; Yun Ma leg.; ZJUH No. 200108519. – **Hubei** • 2 ♂♂; Zhu Mt.; 28 Aug. 1982; Junhua He leg.; ZJUH Nos 824802, 824806. – **Heilongjiang** • 1 ♀; Jingpo River; 26 Aug. 1995; Juxian Lou leg.; ZJUH No. 962294. – **Jilin** • 1 ♂; Gongzhuling; Aug.–Sep. 1983; Chenglun Wang leg.; ZJUH No. 840072 • 10 ♀♀; same data as for preceding; ZJUH Nos 840039, 840041, 840045, 840046, 840047, 840051, 840056, 840060, 840071, 840073 • 1 ♀; Longtan Mt.; 21 Aug. 1995; Juxian Lou leg.; ZJUH No. 961855. – **Liaoning** • 1 ♀; Shenyang; 21 Aug. 1977; Junhua He leg.; ZJUH No. 771213 • 2 ♀♀; Dalian; 18 Aug. 1991; Juxian Lou leg.; ZJUH Nos 952428, 952429 • 1 ♀; same data as for preceding; 5 Sep. 1992; Juxian Lou leg.; ZJUH No. 976203 • 5 ♀♀; same data as for preceding; 16–18 Aug. 1994; Juxian Lou leg.; ZJUH Nos 952330, 952413 to 952416 • 2 ♀♀; Fuxin; 26 Jul. 1992; Juxian Lou leg.; ZJUH Nos 951359, 951374. – **Shandong** • 1 ♀; Qingdao; Lao Mt.; 2–3 Aug. 1995; Ping Cai leg.; ZJUH No. 958317. – **Shanxi** • 1 ♀; Taiyuan; 24 Jun. 1974; ZJUH No. 780719. – **Henan** • 1 ♀; Xinxiang; 25 Aug. 1980; Chengzhong Xu leg.; ZJUH No. 815702. – **Shaanxi** • 1 ♀; Weinan; 30 Aug. 1980; ZJUH No. 200011756. – **Hunan** • 1 ♀; Changsha; 16 Aug. 1985; Naizhong Chen leg.; ZJUH No. 200012116 • 1 ♀; Liuyang; 20 Aug. 1985; Xinwang Dong leg.; ZJUH No. 20044738.

Host

Diaphania pyloalis (Hampson, 1859) (Pyralidae).

Distribution

China (Guangxi Zhuangzu Zizhiqu, Taiwan, Hainan, Zhejiang, Yunnan, Fujian, Henan, Shaanxi, Shanxi, Shandong, Jilin, Liaoning, Hunan, Heilongjiang, Guizhou, Shanghai, Hubei).

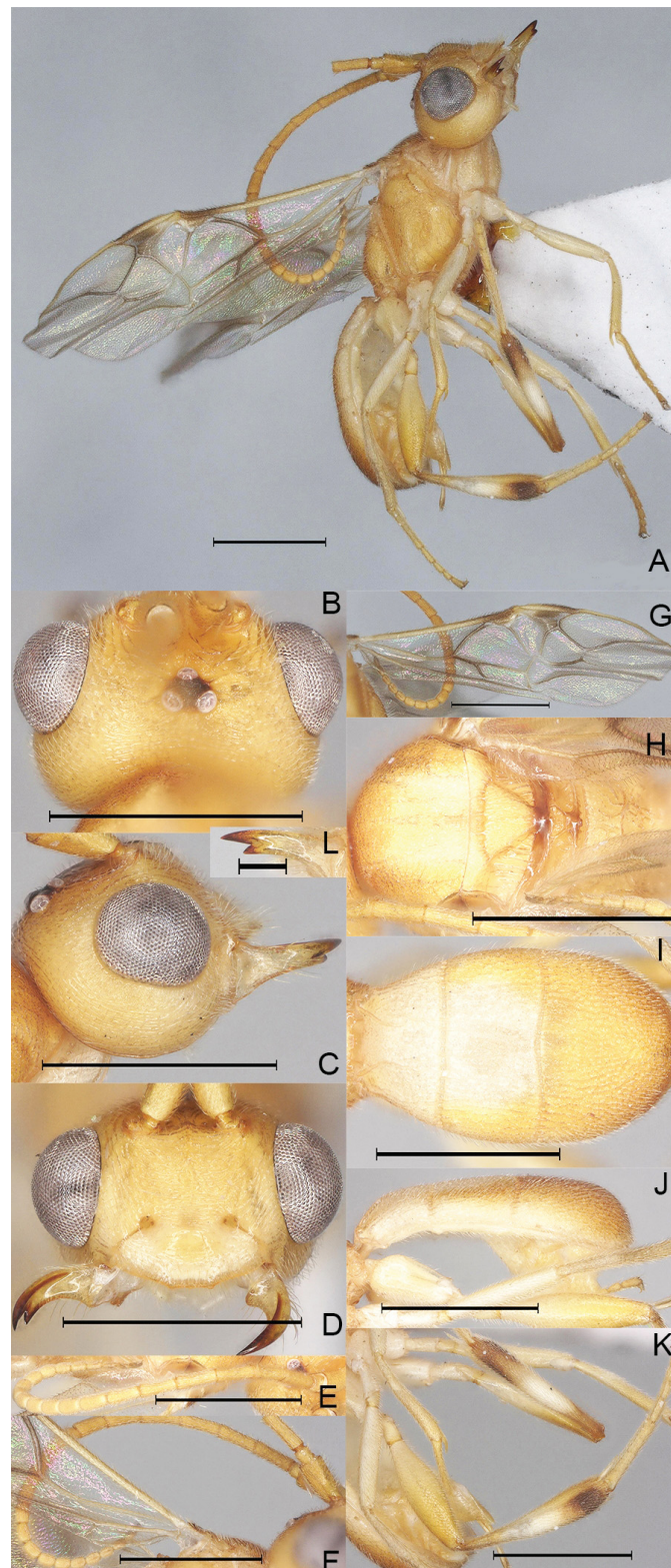


Fig. 12. *Phanerotoma formosana* Rohwer, 1934, China, Taiwan, ♀ (ZJUH No. 201105416). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Apical antenna, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Hind leg. **L.** Mandible, ventral view. Scale bars: A–K=1 mm; L=0.2 mm.

Phanerotoma fuscisternalis sp. nov.

urn:lsid:zoobank.org:act:928E58E8-E786-4BA4-A746-BA9F513E3474

Fig. 13

Diagnosis

Third tergite of metasoma truncate posteriorly (Fig. 13I); clypeus with three small teeth ventrally (Fig. 13E); hypopygium acute apically, with medium-sized and slender triangular protuberance (Fig. 13J); apical half of hind femur dark brown (Fig. 13F); pterostigma dark brown (Fig. 13G); lower tooth of mandible $0.2 \times$ as long as apical tooth (Fig. 13L).

Differential diagnosis

If carapace distinctly convex apically and apical half of hind tarsus infusate, see West Palaearctic *P. dentata* (Panzer, 1805).

Etymology

Named after the dark brown mesosoma, from the Latin '*fuscus*' for 'dusky, dark' and '*sternum*' for 'breastbone'.

Type material

Holotype

CHINA – **Jilin** • ♀; Changchun; 23 Jul. 1982; Juxian Lou leg.; ZJUH No. 950973.

Paratypes (11 ♀♀, 5 ♂♂)

CHINA – **Jilin** • 5 ♂♂; same data as for holotype; ZJUH Nos 950965, 950968, 950969, 950972, 950974 • 4 ♀♀; same data as for preceding; ZJUH Nos 950967, 950966, 950970, 950971. – **Zhejiang** • 1 ♀; Longquan; Fengyang Mt.; 30 Jul. 2007; Jingxian Liu leg.; ZJUH No. 200801447. – **Shaanxi** • 1 ♀; Fengxian; $34^{\circ}15'N$ $106^{\circ}58'E$; elev. 1501 m; 21–22 Aug. 2013; Bingbing Tu leg.; ZJUH No. 201300366LT. – **Taiwan** • 1 ♀; Baxian Mt.; 4 Apr. 2011; Pu Tang leg.; ZJUH No. 202300115. – **Henan** • 1 ♀; Jigong Mt.; 10 Jul. 1997; Xuexin Chen leg.; ZJUH No. 973593 • 1 ♀; Baotianman; 13–15 Jul. 1998; Xuexin Chen leg.; ZJUH No. 991769. – **Hebei** • 1 ♀; Handan; 17 Aug. 1977; Zhongshi Ma leg.; ZJUH No. 780151. – **Heilongjiang** • 1 ♀; Jingbo River; 26 Aug. 1995; Juxian Lou leg.; ZJUH No. 962184.

Description

Female

MEASUREMENTS. Length of body 4.3 mm, of fore wing 3.6 mm.

COLOURATION. Yellow; stemmaticum, parastigma, pterostigma, mesonotum except medially, side of scutellum, propodeum laterally, second tergite laterally, third tergite largely and hind femur apically dark brown, hind tibia with dark brown patch; temple posteriorly in dorsal view, teeth of mandible and scutellum brown.

HEAD. Width $1.4 \times$ median length in anterior view (Fig. 13E) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 13D); antenna with 23 segments, six subapical segments moniliform, and antenna gradually narrowed and slender (Fig. 13F); area of stemmaticum mainly granulate; OOL: diameter of posterior ocellus:POL=32:12:9; eye $1.4 \times$ as long as temple in dorsal view (Fig. 13C); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face diagonally rugose laterally and transversely rugose medially, without median carina; clypeus smooth and shiny, about as wide as minimum width of face, intertentorial distance $2.4 \times$ minimum width between clypeus and eye, clypeus

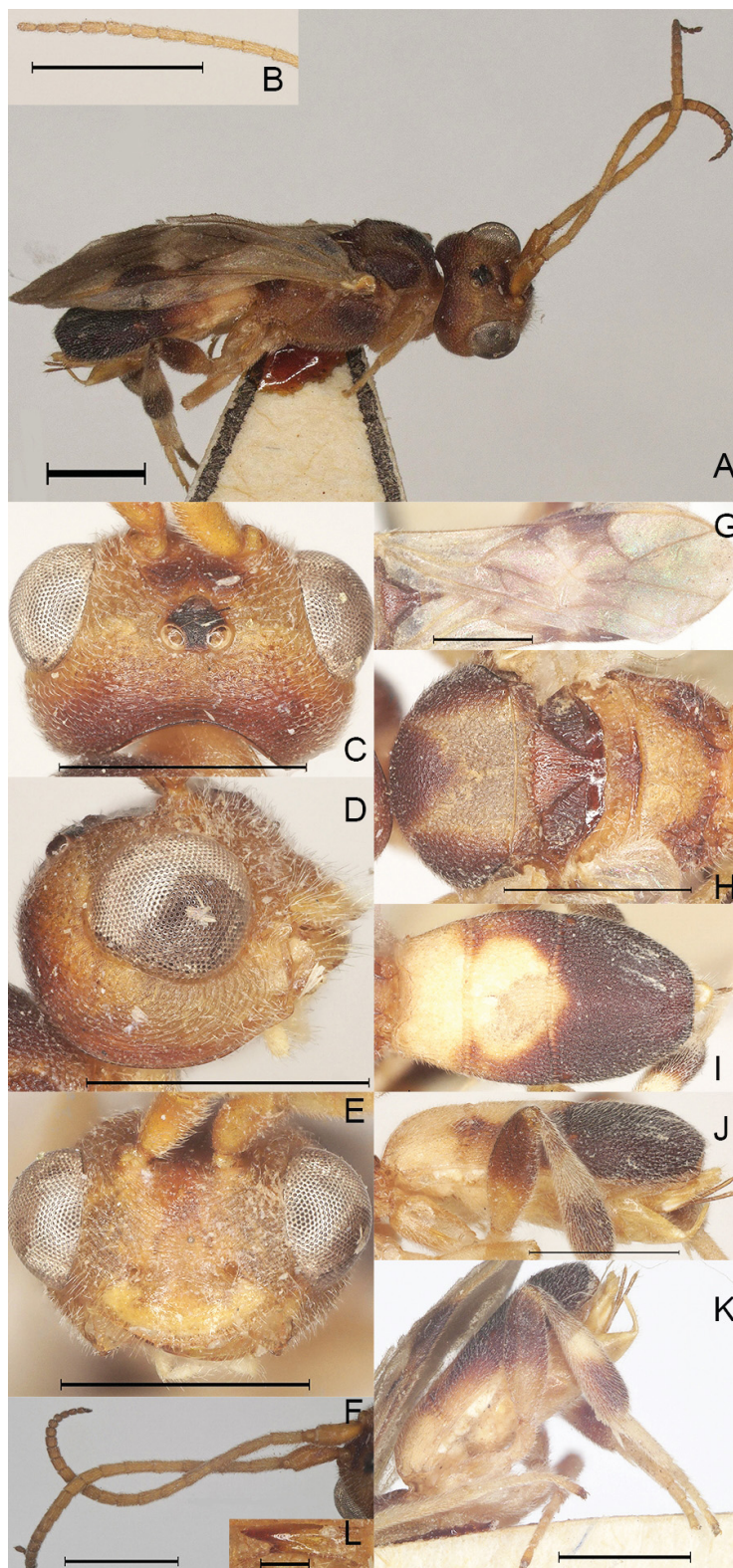


Fig. 13. *Phanerotoma fuscisternalis* sp. nov., holotype, ♀ (ZJUH No. 950973). **A.** Habitus, lateral view. **B.** Apical antenna, lateral view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Antenna, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Hind leg. **L.** Mandible, ventral view. Scale bars: A–K = 1 mm; L = 0.2 mm.

long erect setose and with 3 small teeth medio-ventrally (Fig. 13E); eye medium-sized, in lateral view $1.5\times$ as wide as temple (Fig. 13D), in anterior view its height $0.7\times$ minimum width of face; upper condyle of mandible close to lower level of eyes (Fig. 13E); malar space as long as basal width of mandible; lower tooth of mandible $0.2\times$ length of apical tooth, short and minute (Fig. 13L).

MESOSOMA (Fig. 13H). Length $1.4\times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 13H); scutellum triangular, flat, longitudinally rugose and rather shiny; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, latero-posteriorly tuberculate, no transverse or median carinae.

WINGS. Fore wing $2.7\times$ as long as its maximum width; length of 1-R1 $1.8\times$ as long as pterostigma; r of fore wing $0.5\times$ as long as 3-SR; distance between 1-R1 and wing apex $0.5\times$ 1-R1; 2-SR distinctly bent (Fig. 13G); SR1 nearly straight; 2-SR+M present; pterostigma large, parastigma large; 1-CU1 $0.3\times$ as long as vein 2-CU1, cu-a oblique and $1.2\times$ as long as 1-CU1; r:3-SR:SR1=7:15:43; 2-SR:3-SR:r-m=5:3:2; 2-M bent (Fig. 13G).

LEGS (Fig. 13K). Hind femur with satin sheen, $3.5\times$ as long as wide and widened submedially; hind tibia swollen (Fig. 13K) and with dark brown patch; middle tibia with large yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 13I–J). Carapace elliptical in dorsal view, $1.7\times$ as long as wide and $1.2\times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture wide; third tergite $1.9\times$ as long as second tergite and laterally weakly curved, in dorsal view densely rugose and truncate (Fig. 13I), lateral lamella wide, apically deeply emarginate; ovipositor sheath narrow (Fig. 13J), with some long and erect setae; hypopygium apically acute, with up-curved medium-sized and slender triangular protuberance (Fig. 13J).

VARIATION. Length of fore wing of female 4.2–5.5 mm; vein cu-a 1.0 – $1.2\times$ as long as vein 1-CU1; lower tooth of mandible 0.2 – $0.4\times$ as long as length of apical tooth; apical half of hind femur brownish or dark brown.

Male

Very similar to female, but six subapical antennal segments cylindrical and longer (Fig. 13B); eye large, in dorsal view $1.7\times$ as long as temple.

Host

Unknown.

Distribution

China (Taiwan, Zhejiang, Shaanxi, Jilin, Henan, Hebei, Heilongjiang).

Phanerotoma grapholithae Muesebeck, 1933

Fig. 14

Phanerotoma grapholithae Muesebeck, 1933: 50.

Phanerotoma grapholithae – Fahringer 1937: 518. — Shenefelt 1973: 916. — Zettel 1992: 303.

Diagnosis

Eye $0.9\times$ as long as temple in dorsal view (Fig. 14B); first discal cell of fore wing narrowly truncate (Fig. 14F); POL as long as diameter of posterior ocellus (Fig. 14D); clypeus comparatively transverse

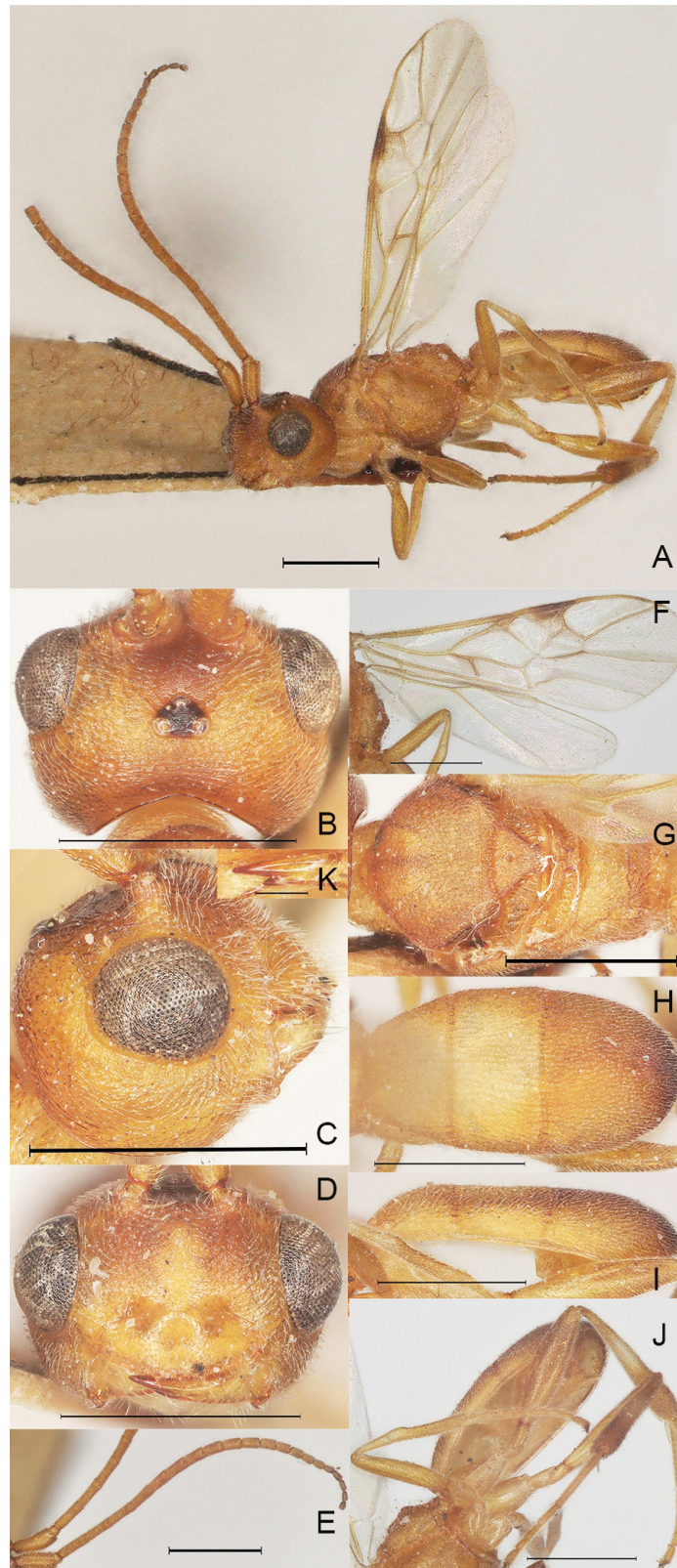


Fig. 14. *Phanerotoma grapholithae* Muesebeck, 1933, China, Shaanxi, ♀ (ZJUH No. 791213). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

(Fig. 14D), its maximum width about $2.5 \times$ its maximum height; vein r of fore wing almost linear with vein 3-SR; vein 2-SR of fore wing about twice as long as vein r.

Differential diagnosis

Differs from *P. fasciata* Provancher, 1881, because *P. fasciata* has comparatively small ocelli and vein 2-SR of the fore wing slightly curved, but the shape of the clypeus was not indicated by Zettel (1992).

Type material

Holotype

JAPAN • ♀; Kanagawa, Takatsu; 22 Jun. 1932; G. Haeussler leg.; USNM ENT01569152.

Other material examined (16 ♀♀, 6 ♂♂)

CHINA – **Beijing** • 1 ♂; Miyun; 2 Jul. 1980; Guirong Shi leg.; ZJUH No. 804197 • 5 ♀♀; same data as for preceding; ZJUH Nos 804191, 804192, 804195, 804196, 804198. – **Hebei** • 2 ♂♂; Dingxian; Jun. 1955; ZJUH Nos 57015.1a, 57015.1b • 3 ♀♀; same data as for preceding; ZJUH Nos 57015.1c to 57015.1e • 3 ♀♀; Changli; 21 Oct. 1954; Ji Cao leg.; ZJUH Nos 5425.3a to 5425.3c • 1 ♀; same data as for preceding; IZCAS IOZ(E) 2059952. – **Nei Mongol Zizhiqu** • 1 ♂; Baotou, Bikeqi; 1–21 Jun. 1983; Daping Yan leg.; ZJUH No. 835225a • 1 ♀; same data as for preceding; ZJUH No. 835225b. – **Shaanxi** • 1 ♀; Weinan; 1986; Gufang Ma leg.; ZJUH No. 860999 • 1 ♀; Zhouzhi; 1979; Jian Yang leg.; No. 791213 • 1 ♀; Wugong; 24 Jul. 1987; ZJUH No. 200011689. – **Shanxi** • 2 ♂♂; Taigu; 1981; Kecheng Cao leg.; ZJUH Nos 810176a, 810176b.

Hosts

Spilonota lechriaspis Meyrick, 1932, *Grapholitha inopinata* Heinrich, 1928, *G. funebrana* Treitschke, 1835, *G. molesta* (Busck, 1916) and *G. prunivora* Ragonot, 1879 (all Tortricidae).

Distribution

Japan, Korea, U.S.A., China (Beijing, Hebei, Nei Mongol Zizhiqu, Shaanxi, Shanxi). China is a new record.

Phanerotoma kozlovi Shestakov, 1930

Phanerotoma kozlovi Shestakov, 1930: 103.

Phanerotoma kozlovi – Telenga 1941: 234. — Shenefelt 1973: 295. — van Achterberg 1990: 41. — Tobias 2000: 428. — Gadallah & Ghahari 2013: 1934.

Diagnosis

Mesosternum shiny and largely smooth; vein 1-R1 of fore wing about as long as pterostigma; maximum width of pterostigma about $0.9 \times$ 3-SR; middle tibia with small blister; vein 2-SR of fore wing evenly curved and vein 3-SR about twice as long as vein r; first and second metasomal tergites coarsely and densely rugose; third tergite comparatively convex and rather truncate apically; teeth of clypeus comparatively large.

Type material

Holotype

MONGOLIA • ♀; Sulejchè u Satsjzjou River, Gamun Gobi; 7 Aug. 1895; Vladimir Kozlov leg.

Host

Unknown.

Distribution

Afghanistan, Azerbaijan, Iran, Kazakhstan, Mongolia, Russia, Turkmenistan, China (Shaanxi).

Phanerotoma inclinata sp. nov.

urn:lsid:zoobank.org:act:359B0375-3830-425F-8F0C-080907321034

Fig. 15

Diagnosis

Vein r of fore wing medium-sized (Fig. 15G), vein 3-SR about twice as long as vein r; vein 1-CU1 comparatively long (Fig. 15G); vein 1-M of fore wing brown; apical tooth of mandible robust (Fig. 15L); temple comparatively wide, in lateral view about as long as eye (Fig. 15D); clypeus with three slender and comparatively large teeth (Fig. 15E); fore wing with dark bands; stemmaticum small (Fig. 15G).

Etymology

Named after the bent vein 2-SR of the fore wing, from the Latin '*clino*' for 'bend, slope'.

Type material

Holotype

CHINA – Guangxi Zhuangzu Zizhiqu • ♀; Gunbeilao Mt.; elev. 1100–1600 m; 27 Aug. 2001; Guofang Jiang leg.; ZJUH No. 20021376.

Paratypes (32 ♀♀, 3 ♂♂)

CHINA – Guangxi Zhuangzu Zizhiqu • 1 ♀; same data as for holotype; ZJUH No. 200213668. – Zhejiang • 4 ♀♀; Longquan; Fengyang Mt.; 16–27 Aug. 1982; Kunyan Zhu leg.; ZJUH Nos 824982a to 824982d • 3 ♀♀; same data as for preceding; Yunsheng Zhao leg.; ZJUH Nos 826633a to 826633c • 1 ♀; same data as for preceding; Xuexin Chen leg.; ZJUH No. 826650 • 3 ♀♀; same data as for preceding; 7–14 Aug. 2003; Jingxian Liu leg.; ZJUH Nos 20045220, 20045224, 2004522 • 4 ♀♀; Songyang; 7–17 Oct. 1994; Hanlin Chen leg.; ZJUH Nos 948484, 948486a, 948486b, 9484887 • 1 ♀; Taishun; Wuyanling Mt.; 25 Aug. 1983; Zhenbing Cai leg.; ZJUH No. 833261 • 4 ♀♀; same data as for preceding; 30–31 Jul. 2005; Peng Xu leg.; ZJUH Nos 200605084, 200605089, 200605093, 200605142 • 2 ♀♀; same data as for preceding; 28 Jul.–5 Aug. 2005; Jingxian Liu leg.; ZJUH Nos 200609766, 2006099767 • 1 ♀; Suichang; Jiulong Mt.; 24 Aug. 1991; Ying Qian leg.; ZJUH No. 930145 • 3 ♂♂; Songyang; Ruoliaojian; 17 Aug. 1994; Xuexin Chen and Zaifu Xu leg.; ZJUH Nos 944406, 944596, 944598 • 8 ♀♀; same data as for preceding; ZJUH Nos 944206, 944599, 944595, 944620, 944606, 944402, 944403, 944599.

Description

Female

MEASUREMENTS. Length of body 4.9 mm, of fore wing 3.5 mm.

COLOURATION. Yellow; frons, stemmaticum, temple dorsally, face medially, mesoscutum except medially, scutellum, side of scutellum, propodeum, first tergite postero-laterally, second tergite laterally, third tergite dorsally, pterostigma, parastigma, veins r, 3-SR, 2-M, 1-M, 1-CU1 and cu-a, and apex of 2-CU1 of fore wing dark brown; teeth of mandible, hind femur and tibia apically brown.

HEAD. Width $1.5 \times$ median length in anterior view (Fig. 15E) and part of head above eye in lateral view $0.4 \times$ height of eye (Fig. 15D); antenna with 23 segments and $1.2 \times$ as long as fore wing, five subapical antennal segments not moniliform (Fig. 15F), penultimate segment $1.6 \times$ as long as wide; area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=32:10:8; eye about as long as temple in dorsal view (Fig. 15C); frons with longitudinal rugae medially, rugose laterally and

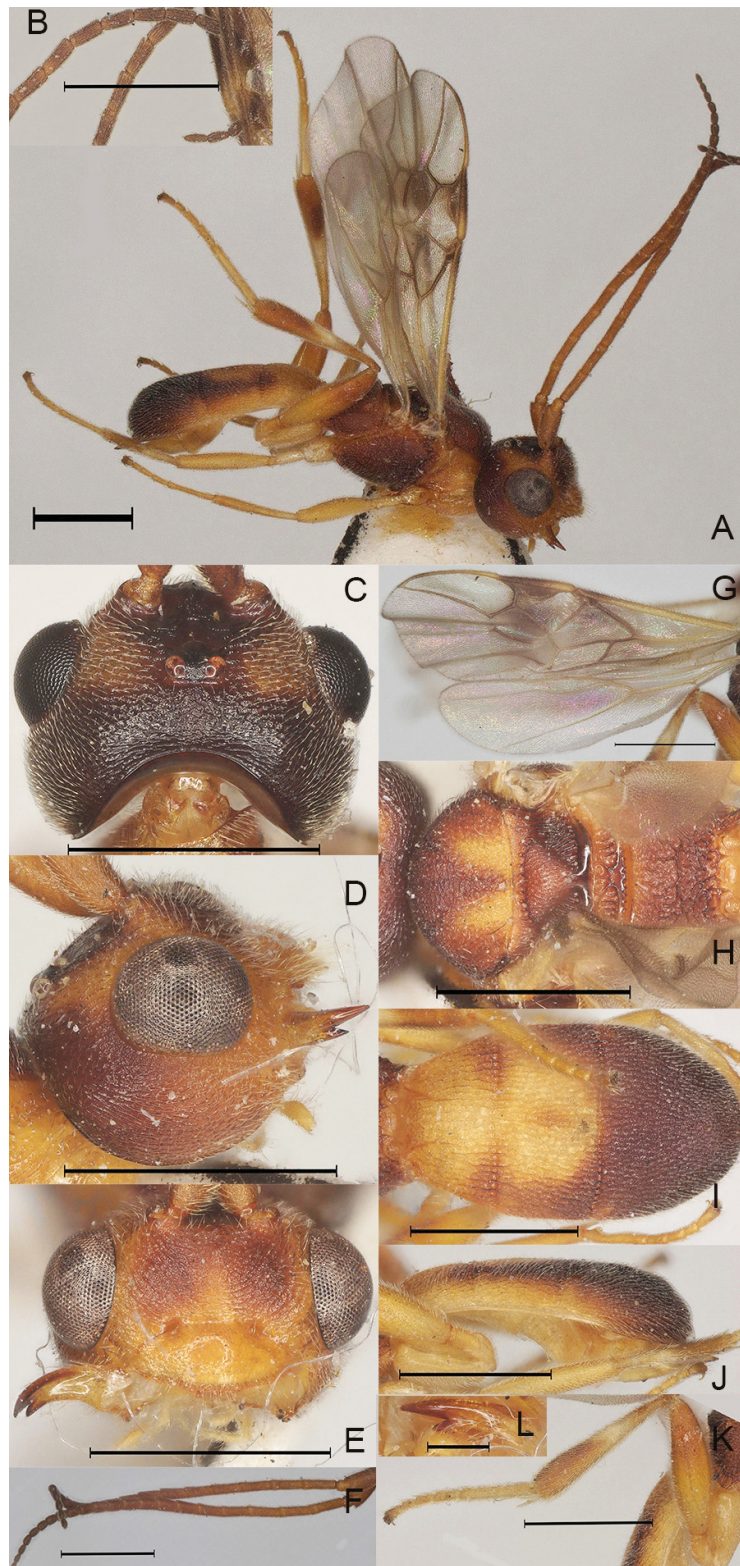


Fig. 15. *Phanerotoma inclinata* sp. nov. **A, D–L.** Holotype, ♀ (ZJUH No. 20021376). **B.** Paratype, ♂ (ZJUH No. 944406). **A.** Habitus, lateral view. **B.** Apical antenna, lateral view. **C.** Head, dorsal view (of paratype, ♀, ZJUH No. 200213668). **D.** Head, lateral view. **E.** Head, anterior view. **F.** Antenna, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Hind leg. **L.** Mandible, ventral view. Scale bars: A–K = 1 mm; L = 0.2 mm.

with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face with diagonal rugae and with median ridge; clypeus smooth, shiny and $0.9 \times$ minimum width of face, intertentorial distance $2.0 \times$ minimum width between clypeus and eye, clypeus with long erect setae and with 3 minute teeth medio-ventrally (Fig. 15E); temple large and in lateral view as wide as temple (Fig. 15D), in anterior view its height $0.6 \times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 15E); malar space $0.9 \times$ as long as basal width of mandible; lower tooth of mandible $0.4 \times$ length of apical tooth, robust and short (Fig. 15L).

MESOSOMA (Fig. 15H). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 15H); scutellum triangular, flat, distinctly longitudinally rugose and rather shiny; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, no transverse or median carinae.

WINGS. Fore wing $3.3 \times$ as long as its maximum width; length of 1-R1 $1.3 \times$ as long as pterostigma; r $0.5 \times$ 3-SR; distance between 1-R1 and wing apex $0.4 \times$ 1-R1; 2-SR bent (Fig. 15G); SR1 bent; 2-SR+M present; pterostigma large, parastigma small; 1-CU1 $0.4 \times$ as long as vein 2-CU1, cu-a oblique and $0.9 \times$ as long as 1-CU1; r : 3-SR : SR1 = 12 : 26 : 94; 2-SR : 3-SR : r-m = 45 : 26 : 15; 2-M slightly bent (Fig. 15G).

LEGS (Fig. 15K). Hind femur moderately wide and with satin sheen, $3.7 \times$ as long as wide and rather widened submedially; hind tibia rather slender; middle tibia with medium-sized pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 15I–J). Carapace elliptical in dorsal view, $1.8 \times$ as long as wide and $1.2 \times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite $1.3 \times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view convex medially, densely and semi-circularly rugose and rounded (Fig. 15I), lateral lamella narrow, medio-apically with emargination; ovipositor sheath narrow (Fig. 15J), with some long and erect setae; hypopygium apically acute and with short triangular protuberance (Fig. 15J).

VARIATION. Length of body 4.3–4.9 mm; penultimate segment 1.6 – $1.8 \times$ as long as wide; hind femur moderately wide and with satin sheen, 3.7 – $4.3 \times$ as long as wide; vein 1-CU1 of fore wing 0.2 – $0.3 \times$ as long as vein 2-CU1, vein 3-SR 0.7 – $0.8 \times$ as long as vein 2-SR, vein 2-SR bent or curved.

Male

Very similar to female, but subapical segments slenderer (Fig. 15B), penultimate segment $2.8 \times$ as long as wide; vein 3-SR about $3 \times$ as long as vein r.

Host

Unknown.

Distribution

China (Guangxi Zhuangzu Zizhiqu, Zhejiang).

Phanerotoma longzhouensis sp. nov.

urn:lsid:zoobank.org:act:93CC4388-64B9-430D-B7A7-708153F0E48F

Fig. 16

Diagnosis

Ovipositor sheath slender (Fig. 16J); second metasomal suture curved (Fig. 16I); third metasomal tergite $1.8 \times$ as long as second tergite, in dorsal view densely granulate-rugose with wide apical emargination;

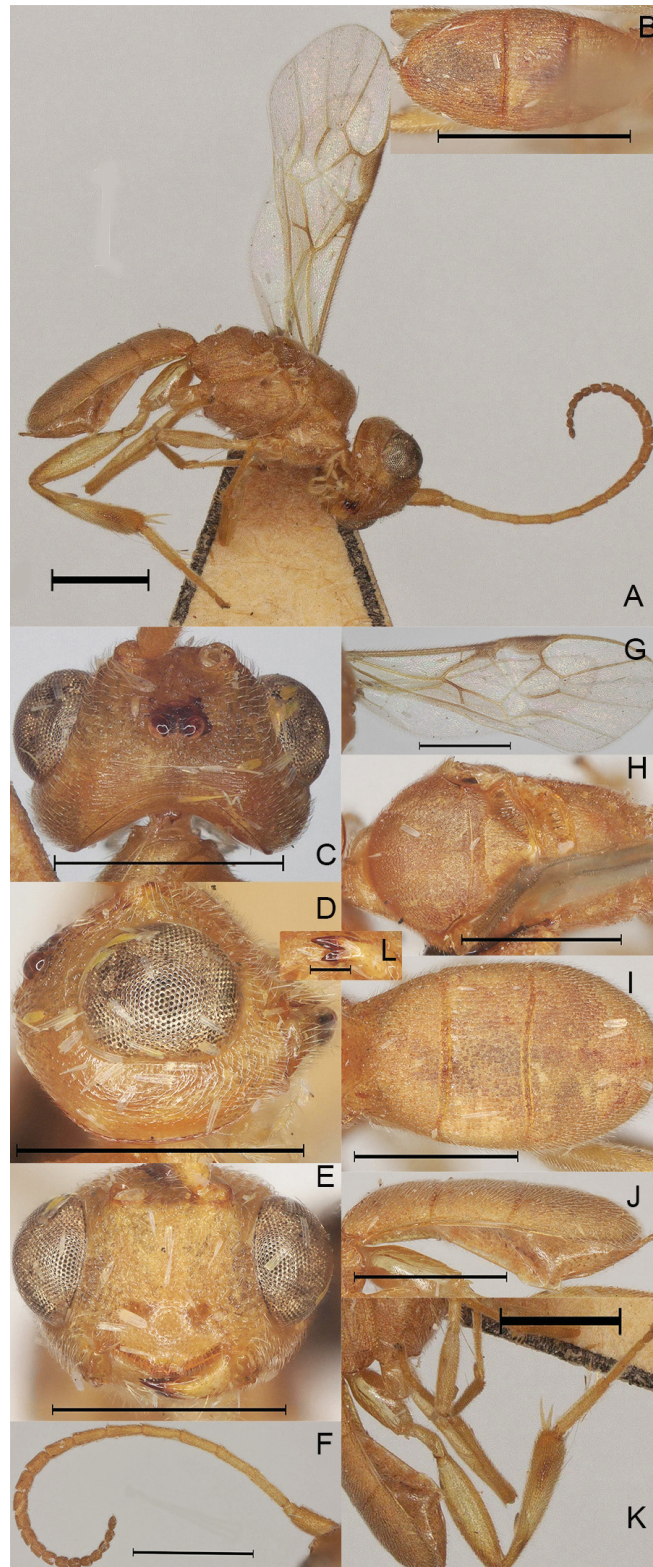


Fig. 16. *Phanerotoma longzhouensis* sp. nov. **A, C–L.** Holotype, ♀ (ZJUH No. 821619a). **B.** Paratype, ♂ (ZJUH No. 821671a). **A.** Habitus, lateral view. **B.** First third of metasomal tergites, dorsal view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Antenna, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Hind leg. **L.** Mandible, ventral view. Scale bars: A–K=1 mm; L=0.2 mm.

malar space as long as basal width of mandible (Fig. 16E); posterior lamella of third metasomal tergite wide medially; head behind stemmaticum flattened; eyes strongly protruding in dorsal view (Fig. 16C).

Etymology

Named after the collection site of the holotype (Longzhou).

Type material

Holotype

CHINA – **Guangxi Zhuangzu Zizhiqu** • ♀; Longzhou, Nonggang; 20 May 1982; Junhua He leg.; ZJUH No. 821619a.

Paratypes (47 ♀♀, 3 ♂♂)

CHINA – **Guangxi Zhuangzu Zizhiqu** • 1 ♂; same data as for holotype; ZJUH No. 821671a • 45 ♀♀; same data as for preceding; ZJUH Nos 821534a to 821534e, 821554, 821619b, 821619c, 821620, 821630a to 821630c, 821670a to 821670k, 821671b, 821718, 821720, 822153, 822204a to 822204e, 824396a to 824396m • 1 ♀; same data as for preceding; 17 May 1982; Fasheng Li leg.; ZJUH No. 871936 • 1 ♂; Jiuwanda Mts; 30 Jul. 2003; Yiping Wang leg.; ZJUH No. 20034901. – **Guangdong** • 1 ♂; Ruyuan, Nanling; 9–18 Jul. 2005; Yali Cai leg.; ZJUH No. 200609636. – **Fujian** • 1 ♀; Wuyi Mt.; 9 Oct. 1980; Jiahua Chen leg.; ZJUH No. 20003800.

Description

Female

MEASUREMENTS. Length of body 4.3 mm, of fore wing 3.7 mm.

COLOURATION. Yellow; stemmaticum, tegula and teeth of mandible dark brown.

HEAD. Width $1.3 \times$ median length in anterior view (Fig. 16E) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 16D); antenna with 23 segments and $1.3 \times$ as long as fore wing, six subapical antennal segments moniliform (Fig. 16F); area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=286:112:70; eye $1.5 \times$ temple in dorsal view (Fig. 16C); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face granulate-rugose and without median carina; clypeus smooth, shiny and $0.8 \times$ minimum width of face, intertentorial distance $1.3 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 small teeth medio-ventrally (Fig. 16E); eye large and in lateral view $1.7 \times$ as wide as temple (Fig. 16D), in anterior view its height $0.9 \times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 16E); malar space as long as basal width of mandible; lower tooth of mandible $0.5 \times$ length of apical tooth, small and short (Fig. 16L).

MESOSOMA (Fig. 16H). Length $1.7 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 16H); scutellum triangular, flat, distinctly granulate-rugose and rather shiny; metanotum with no short median carina anteriorly or small tooth; propodeum coarsely reticulate-rugose, latero-posteriorly not tuberculate, no transverse or median carinae.

WINGS. Fore wing $2.8 \times$ as long as its maximum width; length of 1-R1 $1.6 \times$ as long as pterostigma; r of fore wing $0.5 \times$ 3-SR; distance between 1-R1 and wing apex $0.4 \times$ 1-R1; 2-SR nearly straight (Fig. 16G); SR1 straight; 2-SR+M present; pterostigma large, parastigma medium-sized; 1-CU1 $0.5 \times$ as long as vein 2-CU1, cu-a oblique and $0.7 \times$ as long as 1-CU1; r:3-SR:SR1=15:25:97; 2-SR:3-SR:r-m=42:25:16; 2-M bent (Fig. 16G).

LEGS (Fig. 16K). Hind femur moderately wide and with satin sheen, $3.7\times$ as long as wide and rather widened submedially; hind tibia rather swollen; middle tibia with medium-sized yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 16I–J). Carapace elliptical in dorsal view, $1.7\times$ as long as wide and as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite $1.8\times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view convex medially, densely and granulate-rugose and rounded (Fig. 16I), lateral lamella with protruding corners latero-apically, and medio-apically widely emarginated; ovipositor sheath narrow (Fig. 16J), with some long and erect setae; hypopygium apically acute, but without triangular protuberance (Fig. 16J).

VARIATION. Length of fore wing 3.5–3.7 mm; lower tooth of mandible $0.3\text{--}0.5\times$ as long as apical tooth; vein r $0.4\text{--}0.5\times$ as long as vein 3-SR; third tergite $1.7\text{--}1.8\times$ as long as second tergite; eye $1.4\text{--}1.6\times$ as long as temple in dorsal view.

Male

Similar to female, but metasomal carapace in dorsal view $2.1\times$ as long as wide (Fig. 16B) and slenderer antenna.

Host

Unknown.

Distribution

China (Guangxi Zhuangzu Zizhiqu, Guangdong, Fujian).

Phanerotoma macrodentata sp. nov.

urn:lsid:zoobank.org:act:450468C1-BB80-445E-A8BA-4F4C9E7F4A61

Fig. 17

Diagnosis

Frons punctate-rugose and coriaceous (Fig. 17C); head in lateral view protruding dorsally and ocelli invisible (Fig. 17D); two apical antennal segments of female much longer than six subapical segments (Fig. 17K); vein 1-R1 of fore wing $1.5\times$ as long as pterostigma (Fig. 17G), vein 1-CU1 $0.6\times$ as long as vein 2-CU1; hypopygium acute apically, lacking an up-curved triangle or apical spine (Fig. 17I).

Etymology

Named after the long lower tooth of the mandible, from the Greek ‘*makros*’ for ‘long’ and the Latin ‘*dens*’ for ‘tooth’.

Type material

Holotype

CHINA – **Guangdong** • ♀; Guangzhou; Jul. 1982; ZJUH No. 940156a.

Paratypes (8 ♀♀, 38 ♂♂)

CHINA – **Guangdong** • 1 ♀; same data as for holotype; ZJUH No. 940156b • 2 ♂♂; same data as for preceding; ZJUH Nos 9310903a, 9310903b • 5 ♂♂; same data as for preceding; Sep.–Oct. 1985; Jianshu Li leg.; ZJUH Nos 860657a to 860657e • 5 ♂♂; Shenzhen; Oct. 1983; Shengzhen Zhou leg.; ZJUH Nos 911090a to 911090e • 13 ♂♂; same data as for preceding; Sep.–Oct. 1985; Jianshu Li leg.;

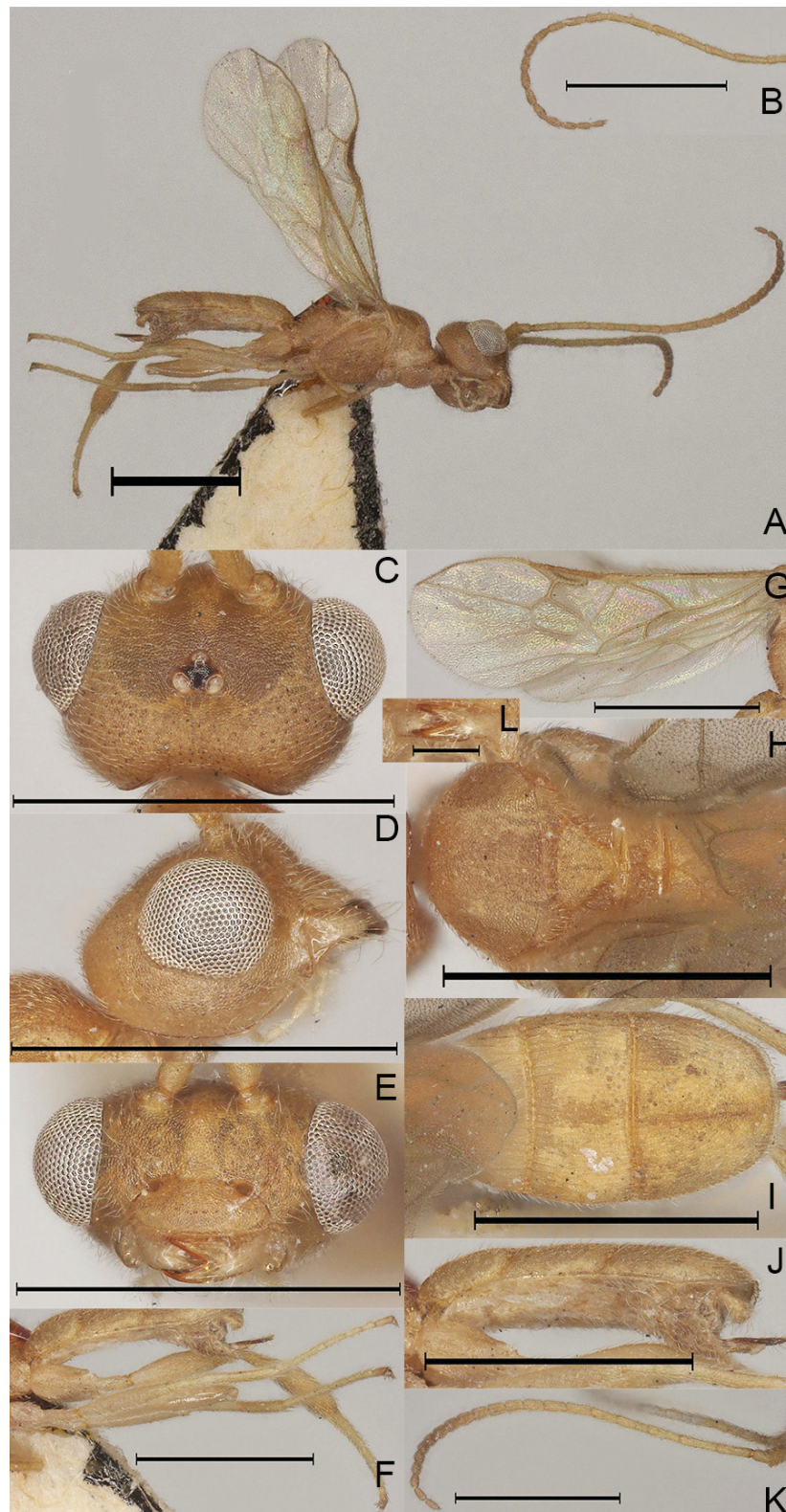


Fig. 17. *Phanerotoma macrodentata* sp. nov. **A, C–L.** Holotype, ♀ (ZJUH No. 940156a). **B.** Paratype, ♂ (ZJUH No. 940156b). **A.** Habitus, lateral view. **B.** Apical antenna, lateral view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Hind leg. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Antenna, lateral view. **L.** Mandible, ventral view. Scale bars: A–K=1 mm; L=0.2 mm.

ZJUH Nos 860653a to 860653m • 1 ♀; same data as for preceding; ZJUH No. 860653n. – **Fujian** • 13 ♂♂; Zhangzhou; 5 Sep. 1984; Huangquan Wu leg.; ZJUH Nos 881412a to 881412m • 6 ♀♀; same data as for preceding; ZJUH Nos 881412n to 881412s.

Description

Female

MEASUREMENTS. Length of body 3.2 mm, of fore wing 3.0 mm.

COLOURATION. Yellow; stemmaticum dark brown; frons yellowish brown; mandible apically and ovipositor sheath brown; legs pale-yellow.

HEAD. Width $1.7\times$ median length in anterior view (Fig. 17E) and part of head above eye in lateral view $0.1\times$ height of eye (Fig. 17D); antenna with 23 segments and $1.2\times$ as long as fore wing, six subapical antennal segments shortened and cylindrical (Fig. 17K), both apical segments elongate, third, fourth and penultimate segments 1.4 , 1.5 and $1.7\times$ as long as wide in lateral view, respectively; area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=36:9:5; eye $1.3\times$ as long as temple in dorsal view (Fig. 17C); frons coriaceous and punctate-rugose, slightly depressed, without median carina; vertex granulate and dull; temple granulate matt and coriaceous; face granulate and with distinct median bump (Fig. 17E); clypeus granulate, matt and $0.7\times$ minimum width of face, intertentorial distance $1.7\times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 indistinct teeth medio-ventrally (Fig. 17E); eye large and in lateral view $1.8\times$ as wide as temple (Fig. 17D), in anterior view its height $0.6\times$ minimum width of face; upper condyle of mandible below lower level of eyes (Fig. 17E); malar space $0.9\times$ as long as basal width of mandible; lower tooth of mandible as long as apical tooth, robust (Fig. 17L).

MESOSOMA (Fig. 17H). Length $1.8\times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely granulate-rugose and matt, densely setose; notauli hardly indicated; scutellar sulcus wide and with eight carinae (Fig. 17H); scutellum triangular, flat, distinctly granulate and matt; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, with transverse carina, no median carina and latero-posteriorly tuberculate.

WINGS. Fore wing $3.0\times$ as long as its maximum width; length of 1-R1 $1.5\times$ as long as pterostigma; r issued relatively close to middle of pterostigma and $0.8\times$ 3-SR; distance between 1-R1 and wing apex $0.3\times$ 1-R1; 2-SR nearly straight (Fig. 17G); SR1 straight; 2-SR+M present; parastigma medium-sized; 1-CU1 $0.6\times$ as long as vein 2-CU1, cu-a inclivous and $0.7\times$ as long as 1-CU1; r:3-SR:SR1=5:7:33; 2-SR:3-SR:r-m=14:7:6; r-m reclivous; 2-M weakly curved (Fig. 17G).

LEGS (Fig. 17F). Hind femur moderately wide and with satin sheen, $4.0\times$ as long as wide and rather widened submedially; hind tibia rather swollen (Fig. 17A); middle tibia with medium-sized ivory blister; hind coxa coriaceous and matt.

METASOMA. (Fig. 17I–J). Carapace elliptical in dorsal view, $1.9\times$ as long as wide and as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture wide; third tergite $1.4\times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex anteriorly, in dorsal view convex medially, densely and semi-circularly rugose and rounded (Fig. 17I), lateral lamella hyaline and its margin finely serrate (Fig. 17I), and medio-apically not emarginate; ovipositor sheath narrow and parallel-sided (Fig. 17J), with some long and erect setae; hypopygium apically acute, lacking an up-curved triangle or apical spine (Fig. 17J).

VARIATION. Length of fore wing 2.7–3.0 mm; frons flat or slightly depressed; eye 1.3 – $1.8\times$ as long as temple in dorsal view.

Male

Very similar to female, but antennal segments longer and 3–7 subapical antennal segments slender and cylindrical (Fig. 17B).

Host

Acrocercops cremerella Snellen, 1904 (Gracillariidae).

Distribution

China (Fujian, Guangdong).

Phanerotoma microdentata sp. nov.

urn:lsid:zoobank.org:act:547A6C29-7CA4-46F5-8B0D-B39024E0C5B8

Fig. 18

Diagnosis

Lower tooth of mandible $0.5 \times$ as long as apical tooth (Fig. 18L); scutellum dull and densely coriaceous (Fig. 18H); second submarginal cell slightly more slender (Fig. 18G); vein cu-a of fore wing as long as vein 1-CU1; body yellowish brown; second metasomal suture straight; third tergite evenly rounded posteriorly and its basal half rather coarsely sculptured (Fig. 18I); hind coxa pale-yellowish (Fig. 18K); hypopygium of female short and triangularly protruding apically (Fig. 18J).

Etymology

Named after the small teeth of the clypeus, from the Greek ‘*mikros*’ for ‘small, little’ and the Latin ‘*dens*’ for ‘tooth’.

Type material

Holotype

CHINA – **Jilin** • ♀; Gongzhuling; Aug.–Oct. 1983; Chenglun Wang leg.; ZJUH No. 840053.

Paratypes (55 ♀♀, 12 ♂♂)

CHINA – **Jilin** • 1 ♀; same data as for holotype; 10 Aug. 1954; Qingfeng Xu leg.; ZJUH No. 5535.5 • 1 ♂; same data as for preceding; 1972; Qingfeng Xu leg.; ZJUH No. 72014.5a • 5 ♀♀ same data as for preceding; ZJUH Nos 72014.5b to 72014.5f • 1 ♀; same data as for preceding; 16 Aug. 1977; Junhua He leg.; ZJUH No. 770982 • 1 ♂; same data as for preceding; Aug.–Sep. 1983; Chenglun Wang leg.; ZJUH No. 840040 • 22 ♀♀; same data as for preceding; ZJUH Nos 840042 to 840044, 840067, 840048 to 840050, 840052, 840054, 840055, 840057 to 840059, 840062 to 840069, 840111 • 1 ♀; Changbai Mt.; 4 Aug. 1994; Juxian Lou leg.; ZJUH No. 951648. – **Beijing** • 1 ♂; Jul. 1962; Changhou Chen leg.; ZJUH No. 62009.4a • 3 ♀♀; same data as for preceding; ZJUH Nos 62009.4b to 62009.4d. – **Heilongjiang** • 2 ♂♂; Harbin; Aug. 1973; Yongkang Chen leg.; ZJUH Nos 740004a, 740004b • 3 ♀♀; same data as for preceding; ZJUH Nos 740004c to 740004e • 1 ♂; same data as for preceding; 1 Aug. 1977; Junhua He leg.; ZJUH No. 771584 • 4 ♀♀; same data as for preceding; ZJUH Nos 771585, 771588, 771595, 771602 • 1 ♀; Jingbo Lake; 26 Aug. 1995; Juxian Lou leg.; ZJUH No. 951419. – **Anhui** • 1 ♀; Yuexi; 26 Sep. 1981; Fuan Yang leg.; ZJUH No. 820575. – **Guangxi Zhuangzu Zizhizhou** • 1 ♀; Longzhou, Nonggang; 20–23 May 1982; Junhua He leg.; ZJUH No. 821630. – **Guizhou** • 1 ♀; Chishui, Nanchanggou; 22 Sep. 2000; Yun Ma leg.; ZJUH No. 20003063 • 2 ♀♀; Chishui, Alsophila Nature Reserve; 21 Sep. 2000; Yun Ma leg.; ZJUH Nos 200603139, 200103232. – **Hainan** • 1 ♀; Wuzhi Mt.; 16 May 2007; Jie Zeng leg.; ZJUH No. 200705106 • 1 ♀; Yinggeling; 23 May 2007; Jingxian Liu; ZJUH No. 200702328. – **Jiangsu** • 1 ♀; Nanjing; 11 Jun. 1958; ZJUH No. 5815.1 • 6 ♂♂; Nanjing; 11

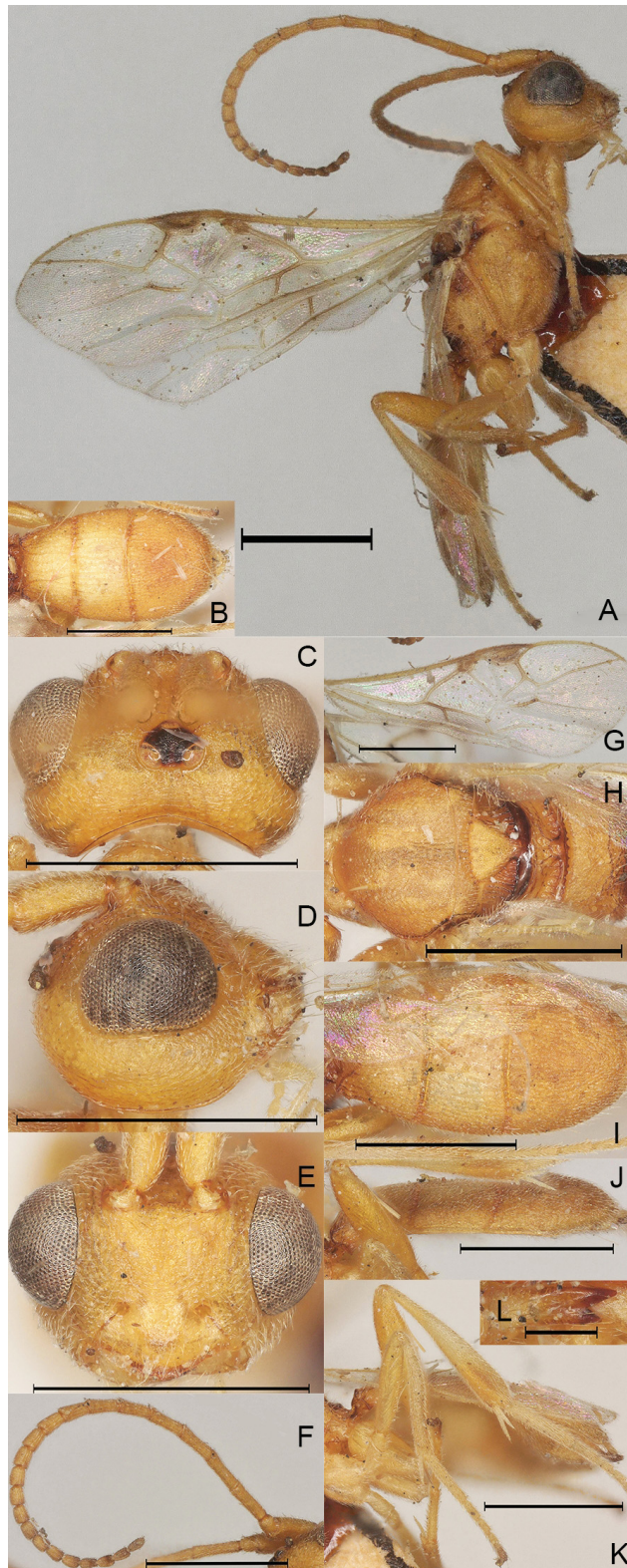


Fig. 18. *Phanerotoma microdentata* sp. nov. **A, C–L.** Holotype, ♀ (ZJUH No. 840053). **B.** Paratype, ♂ (ZJUH No. 72014.5a). **A.** Habitus, lateral view. **B.** First third of metasomal tergites, dorsal view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Antenna, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Hind leg. **L.** Mandible, ventral view. Scale bars: A–K = 1 mm; L = 0.2 mm.

Jun. 1958; ZJUH Nos 5815.1a to 5815.1f • 5 ♀♀; same data as for preceding; ZJUH Nos 5815.1g to 5815.1k. – **Yunnan** • 1 ♀; Kunming; 24 Mar. 1981; Junhua He leg.; ZJUH No. 814515.

Description

Female

MEASUREMENTS. Length of body 4.3 mm, of fore wing 3.7 mm.

COLOURATION. Yellowish brown; stemmaticum, mesoscutum laterally, propodeum, second tergite laterally and third tergite dark brown; first and second tergites pale-yellowish medially; hind femur apically, tibia basally and apically, teeth of mandible and scutellum brown.

HEAD. Width $1.3 \times$ median length in anterior view (Fig. 18E) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 18D); antenna with 23 segments and as long as fore wing, six subapical antennal segments submoniliform (Fig. 18F); area of stemmaticum mainly granulate; OOL : diameter of posterior ocellus : POL = 29 : 11 : 8; eye $1.4 \times$ temple in dorsal view (Fig. 18C); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face with oblique rugae laterally, transversely rugose medially and without median carina; clypeus smooth, shiny and $0.9 \times$ minimum width of face, intertentorial distance $2.6 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 small teeth medio-ventrally (Fig. 18E); eye large and in lateral view $1.6 \times$ as wide as temple (Fig. 18D), in anterior view its height $0.7 \times$ minimum width of face; upper condyle of mandible below lower level of eyes (Fig. 18E); malar space as long as basal width of mandible; lower tooth of mandible $0.5 \times$ length of apical tooth, robust and short (Fig. 18L).

MESOSOMA (Fig. 18H). Length $1.8 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 18H); scutellum triangular, flat, distinctly dull and coriaceous; metanotum without median carina and tooth posteriorly; propodeum coarsely reticulate-rugose, without latero-posterior tubercles, no transverse or median carinae.

WINGS. Fore wing $2.6 \times$ as long as its maximum width; length of 1-R1 $1.4 \times$ as long as pterostigma; r of fore wing $0.5 \times$ 3-SR; distance between 1-R1 and wing apex $0.5 \times$ 1-R1; 2-SR bent (Fig. 18G); SR1 nearly straight; 2-SR+M present; pterostigma large, parastigma medium-sized; 1-CU1 $0.4 \times$ as long as vein 2-CU1, cu-a oblique and as long as 1-CU1; r : 3-SR : SR1 = 15 : 28 : 93; 2-SR : 3-SR : r-m = 49 : 28 : 17; 2-M bent (Fig. 18G).

LEGS (Fig. 18K). Hind femur moderately wide and with satin sheen, $3.5 \times$ as long as wide and rather widened submedially; hind tibia rather slender; middle tibia with medium-sized pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 18I–J). Carapace elliptical in dorsal view, $1.8 \times$ as long as wide and as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite $1.8 \times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view densely and semi-circularly rugose and truncate (Fig. 18I), lateral lamella narrow, medio-apically with wide and deep emargination; ovipositor sheath narrow (Fig. 18J), with some long and erect setae; hypopygium apically acute and with up-curved short triangular protuberance (Fig. 18J).

VARIATION. Length of fore wing 3.1–4.0 mm, vein r of fore wing 0.5 – $1.0 \times$ as long as vein 3-SR.

Male

Very similar to female, but third tergite in dorsal view nearly truncate medio-posteriorly (Fig. 18B) and antennal segments slenderer.

Hosts

Leguminivora glycinivorella (Matsumura, 1898) (Tortricidae) and *Sitotroga cerealella* Olivier, 1789 (Gelechiidae).

Distribution

China (Anhui, Heilongjiang, Jilin, Beijing, Jiangsu, Guizhou, Yunnan, Guangxi Zhuangzu Zizhiqu, Hainan).

Phanerotoma minuta Kokujev, 1903

Fig. 19

Phanerotoma minuta Kokujev, 1903: 286.

Phanerotoma minuta – Shenefelt 1973: 101. — Tobias 1986: 295 (lectotype designation); 2000: 428.

— van Achterberg 1990: 46. — Gadallah & Gharari? 2013: 1935.

Diagnosis

Third tergite very finely rugulose; scapus comparatively narrow in lateral view (van Achterberg 1990: fig. 246); second submarginal cell of fore wing wide, vein 2-SR of fore wing $2.5 \times$ as long as vein r (Fig. 19F); metasomal carapace oval in dorsal view, $1.7 \times$ as long as wide (Fig. 19H); medial length of third tergite about $1.5 \times$ medial length of second tergite, in dorsal view without apical hyaline lamella posteriorly; length of malar space about equal to basal width of mandible (Fig. 19K); clypeus with three minute teeth medio-ventrally; POL $0.4 \times$ as long as largest diameter of posterior ocellus (Fig. 19B).

Type material

Lectotype

TURKMENISTAN • ♀; Repetek; 13 May 1889; A. Semenov leg.; designated by Tobias 1981; Zoological Institute, Academy of Sciences, St. Petersburg, Russia.

Other material examined (6 ♀♀)

CHINA – Gansu • 3 ♀♀; Minqin, Wuwei; $38^{\circ}34' N$, $102^{\circ}59' E$; elev. 1360 m; 22–27 Jul. 2014; Jiangli Tan leg.; NWUX. – Nei Mongol Zizhiqu • 1 ♀; Dapu Temple; 16 Aug. 1978; Jikun Yang leg.; ZJUH No. 200012182. – Xinjiang Uygur Zizhiqu • 1 ♀; Ceqing; 9 Sep. 1979; Dong Chen leg.; ZJUH No. 907613. – Zhejiang • 1 ♀; Mogan Mt.; 15 Sep. 1977; Qihu Chen leg.; ZJUH No. 790889.

Biology

Unknown.

Distribution

Azerbaijan, Iran, Kazakhstan, Mongolia, Turkmenistan, China (Nei Mongol Zizhiqu, Gansu, Xinjiang Uygur Zizhiqu, Zhejiang).

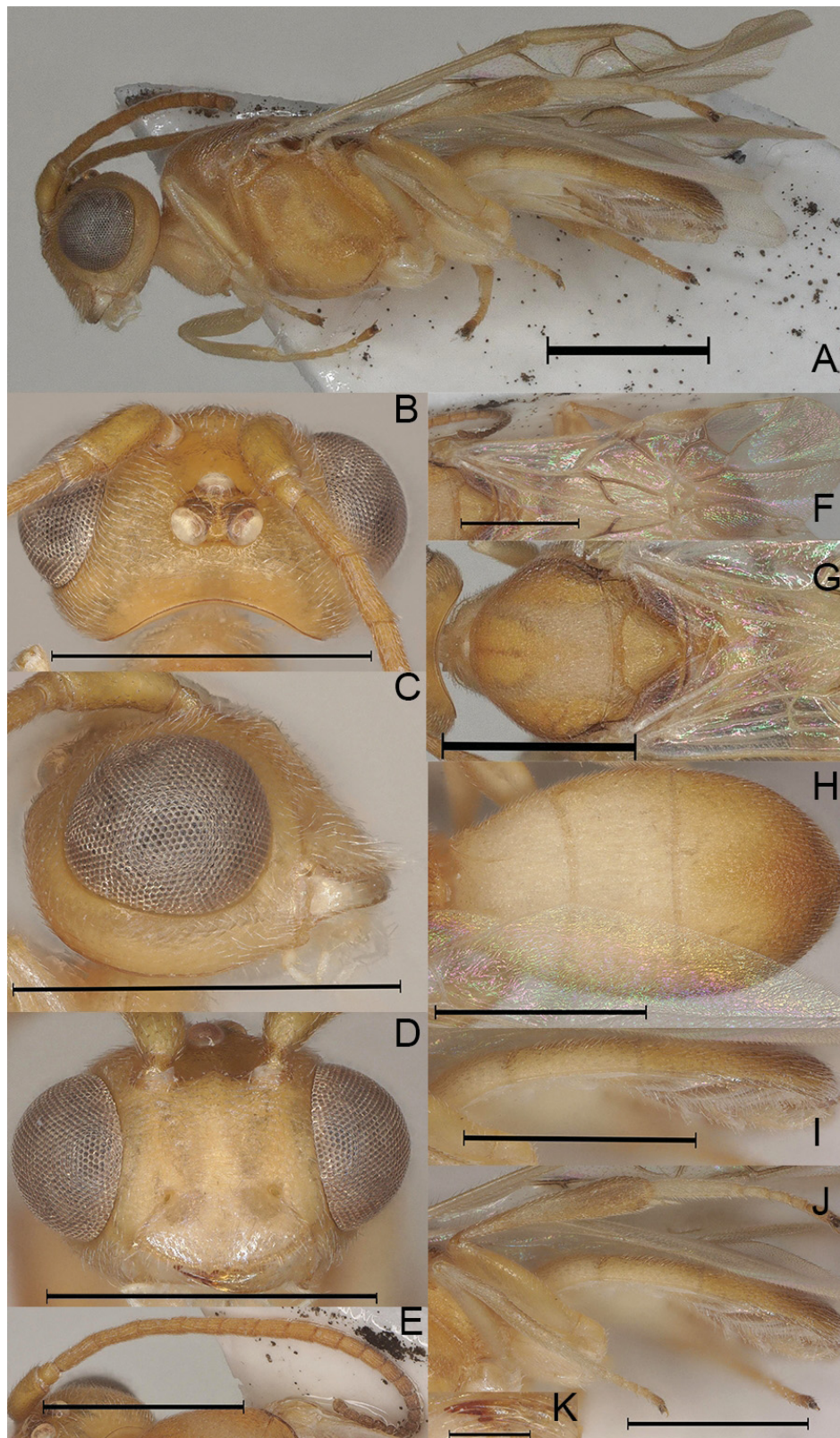


Fig. 19. *Phanerotoma minuta* Kokujev, 1903, China, Gansu, ♀ (NWUX). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

***Phanerotoma moniliata* Ji & Chen, 2003**

Phanerotoma moniliata Ji & Chen in Chen & Ji, 2003: 172.

Diagnosis

Anterior third of vein 2-SR anteriorly close to and subparallel with posterior side of pterostigma, resulting in a narrow parallel gap; vein 1-CU1 of fore wing $0.6\times$ as long as vein 2-CU1; face without median bump; third metasomal tergite of female hardly or not emarginate and without protruding corners posteriorly; third tergite $1.0\text{--}1.3\times$ as long as second tergite; length of eye in dorsal view about $1.8\times$ length of temple; length of malar space $0.4\times$ basal width of mandible.

Type material

Holotype

CHINA – **Jilin** • ♀; Changbai Mt.; 2 Aug. 1989; Xiaohua Zhou leg.

Host

Unknown.

Distribution

China (Jilin, Hubei, Fujian).

***Phanerotoma montana* sp. nov.**

urn:lsid:zoobank.org:act:865E659A-93B0-461C-9D8D-AF64D4B7F5A1

Fig. 20

Diagnosis

Hind tibia rather swollen (Fig. 20I); hypopygium with long triangular protuberance (Fig. 20E); vein 1-SR+M of fore wing issued apically from parastigma (Fig. 20F); length of vein 1-R1 of fore wing $1.7\times$ as long as pterostigma; eye $1.5\times$ as long as temple in dorsal view.

Etymology

Named after its mountainous collecting site, from the Latin '*mons*' for 'mountain'.

Type material

Holotype

CHINA – **Hainan** • ♀; Jianfengling; 4–7 Jun. 2007; Jie Zeng leg.; ZJUH No. 200710985.

Paratypes (3 ♀♀)

CHINA – **Hainan** • 1 ♀; same data as for holotype; ZJUH No. 200711297. – **Taiwan** • 1 ♀; Kaohsiung; 15 Jun.–15 Jul. 2005; National Sun; ZJUH No. 202300037. – **Fujian** • 1 ♀; Jiangle, Longxi Mt.; 30 Sep. 1991; Changming Liu leg.; ZJUH No. 20007246.

Description

Female

MEASUREMENTS. Length of body 2.6 mm, of fore wing 2.3 mm.

COLOURATION. Yellow; stemmaticum, tegula, side of scutellum, metanotum, and second and third tergite dorsally dark brown; teeth of mandible, pterostigma posteriorly, 1-CU1, cu-a and hind tibia apically brown.

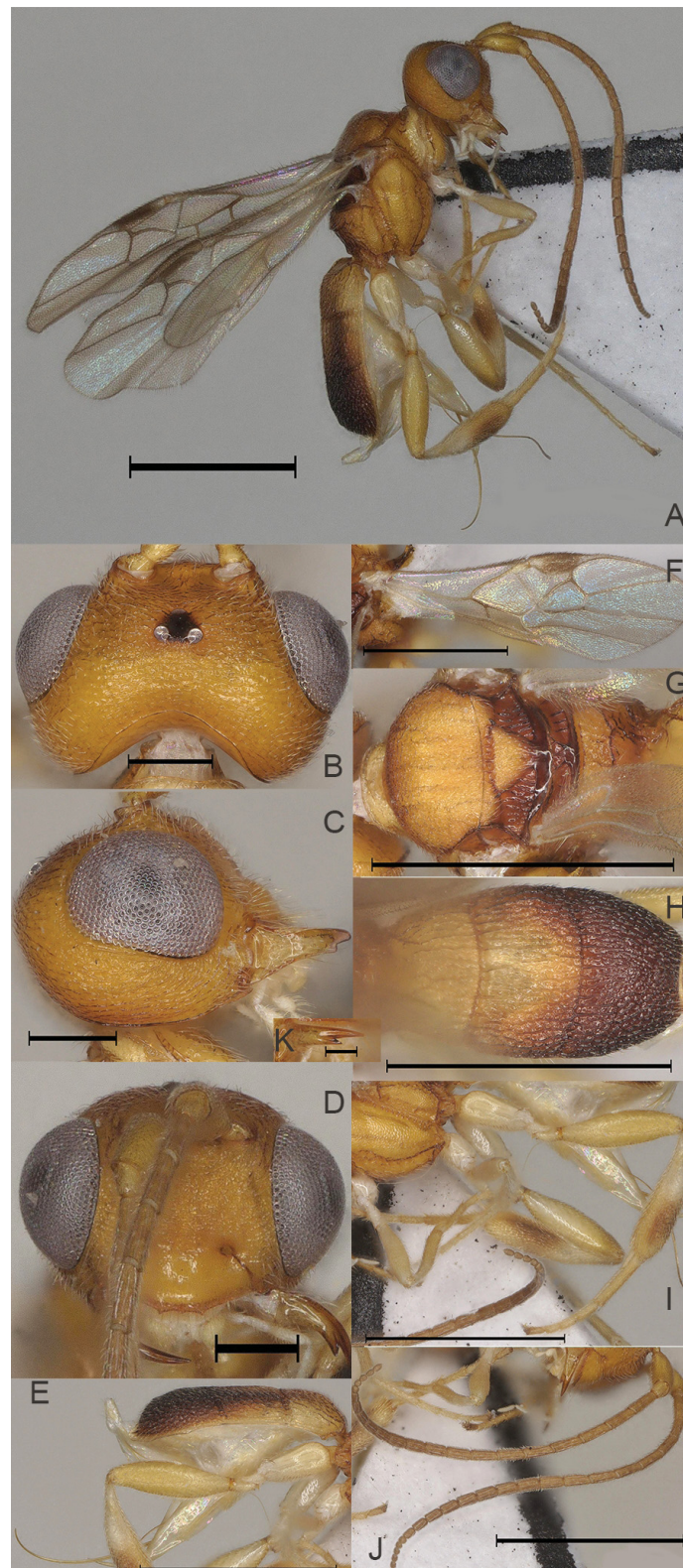


Fig. 20. *Phanerotoma montana* sp. nov., holotype, ♀ (ZJUH No. 200710985). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Metasoma, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Hind leg. **J.** Antenna, lateral view. **K.** Mandible, ventral view. Scale bars: A, E–J=1 mm; B–D =0.2 mm; K=0.1 mm.

HEAD. Width $1.4 \times$ median length in anterior view (Fig. 20D) and part of head above eye in lateral view $0.2 \times$ height of eye (Fig. 20C); antenna with 23 segments and $1.1 \times$ as long as fore wing, five subapical antennal segments moniliform (Fig. 20J); area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=18:4:5; eye $1.5 \times$ temple in dorsal view (Fig. 20B); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face with oblique rugae laterally, transversely rugose medially and without median carina; clypeus smooth, shiny and $0.9 \times$ minimum width of face, intertentorial distance $2.6 \times$ minimum width between clypeus and eye, clypeus with long erect setae and with 3 small teeth medio-ventrally (Fig. 20D); eye large and temple wide, in lateral view $1.5 \times$ as wide as temple (Fig. 20C), in anterior view its height $0.9 \times$ minimum width of face; upper condyle of mandible close to lower level of eyes (Fig. 20D); malar space short, $0.7 \times$ as long as basal width of mandible; lower tooth of mandible $0.3 \times$ length of apical tooth, small and short (Fig. 20K).

MESOSOMA (Fig. 20G). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 20G); scutellum triangular, flat, distinctly longitudinally rugose and rather shiny; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, latero-posteriorly not tuberculate, no transverse or median carinae.

WINGS. Fore wing $3.1 \times$ as long as its maximum width; length of 1-R1 $1.7 \times$ as long as pterostigma; r of fore wing $0.5 \times$ 3-SR; distance between 1-R1 and wing apex $0.3 \times$ 1-R1; 2-SR bent (Fig. 20F); SR1 nearly straight; 2-SR+M present; pterostigma large, parastigma small; 1-CU1 $0.4 \times$ as long as vein 2-CU1, cu-a oblique and $0.8 \times$ as long as 1-CU1; r: 3-SR: SR1=8:16:59; 2-SR: 3-SR:r-m=27:16:10; 2-M straight posteriorly, bent anteriorly (Fig. 20F).

LEGS (Fig. 20I). Hind femur moderately wide and with satin sheen, $3.5 \times$ as long as wide and rather widened submedially; hind tibia distinctly swollen; middle tibia with large ivory blister; hind coxa $2.3 \times$ as long as wide, smooth and shiny.

METASOMA (Fig. 20E, H). Carapace elliptical in dorsal view, $1.7 \times$ as long as wide and as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view densely and semi-circularly rugose and truncate (Fig. 20H), lateral lamella wide with protruding corners latero-apically, medio-apically with wide emargination; ovipositor sheath narrow and long (Fig. 20E), with some long and erect setae; hypopygium apically acute and with up-curved long triangular protuberance (Fig. 20E).

VARIATION. Second tergite entirely yellow or laterally darkened; length of vein 1-R1 of fore wing $1.7\text{-}2.0 \times$ as long as pterostigma.

Male

Unknown.

Host

Unknown.

Distribution

China (Hainan, Taiwan, Fujian).

Phanerotoma nigricornis sp. nov.

urn:lsid:zoobank.org:act:64FAAF32-1523-4C07-AC31-C11ED880D3FD

Fig. 21

Diagnosis

Face in lateral view with minute spiny protuberances (Fig. 21C); clypeus triangular, convex anteriorly and with some longitudinal sculpture (Fig. 21D); malar space long, $1.7\times$ as long as basal width of mandible (Fig. 21D); POL about as long as diameter of posterior ocellus (Fig. 21B); hypopygium apically acute and with short and robust, up-curved triangular protuberance (Fig. 21J).

Etymology

Named after the black antennae, from the Latin '*niger*' for 'black' and '*cornu*' for 'horn'.

Type material

Holotype

CHINA – Sichuan • ♀; Wanglang National Nature Reserve; elev. 2500 m; 25 Jul. 2006; ZJUH No. 200800263.

Description

Female

MEASUREMENTS. Length of body 4.8 mm, of fore wing 4.3 mm.

COLOURATION. Black; veins M+CU, 1-M, 2-SR+M, 2-CU1, 3-CU1, m-cu and anteriorly 2-SR of fore wing, middle tibia with blister, and first and second tergites medially pale-yellow, hind trochanter, femur and tibia apically brown.

HEAD. Width $1.2\times$ median length in anterior view (Fig. 21D) and part of head above eye in lateral view $0.4\times$ height of eye (Fig. 21C); antenna with 23 segments, five subapical antennal segments not moniliform (Fig. 21E), narrow and slender, area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=30:9:9; eye $0.9\times$ temple in dorsal view (Fig. 21B); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face with oblique rugae laterally, transverse-rugose medially and with short median ridge; clypeus smooth, shiny and $0.8\times$ minimum width of face, intertentorial distance $1.8\times$ minimum width between clypeus and eye, long erect setose and with 3 small teeth medio-ventrally (Fig. 21D); temple wide, in lateral view $1.1\times$ as wide as temple (Fig. 21C), in anterior view its height $0.6\times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 21D); malar space long, $1.7\times$ as long as basal width of mandible; lower tooth of mandible $0.4\times$ length of apical tooth, small and short (Fig. 21K).

MESOSOMA (Fig. 21G). Length $1.5\times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 21G); scutellum triangular, flat, distinctly granulate-rugose and rather shiny; metanotum without median carina or tooth; propodeum coarsely reticulate-rugose, without latero-posterior tubercles, no transverse or median carinae.

WINGS. Fore wing $3.2\times$ as long as its maximum width; length of 1-R1 $1.8\times$ as long as pterostigma; r of fore wing $0.8\times$ 3-SR; distance between 1-R1 and wing apex $0.4\times$ 1-R1; 2-SR bent (Fig. 21F); SR1 nearly straight; 2-SR+M present; pterostigma large, parastigma small; 1-CU1 $0.6\times$ as long as vein 2-CU1, cu-a oblique and $0.6\times$ as long as 1-CU1; r:3-SR:SR1=18:22:119; 2-SR:3-SR:r-m=49:22:16; 2-M straight posteriorly, bent anteriorly (Fig. 21F).

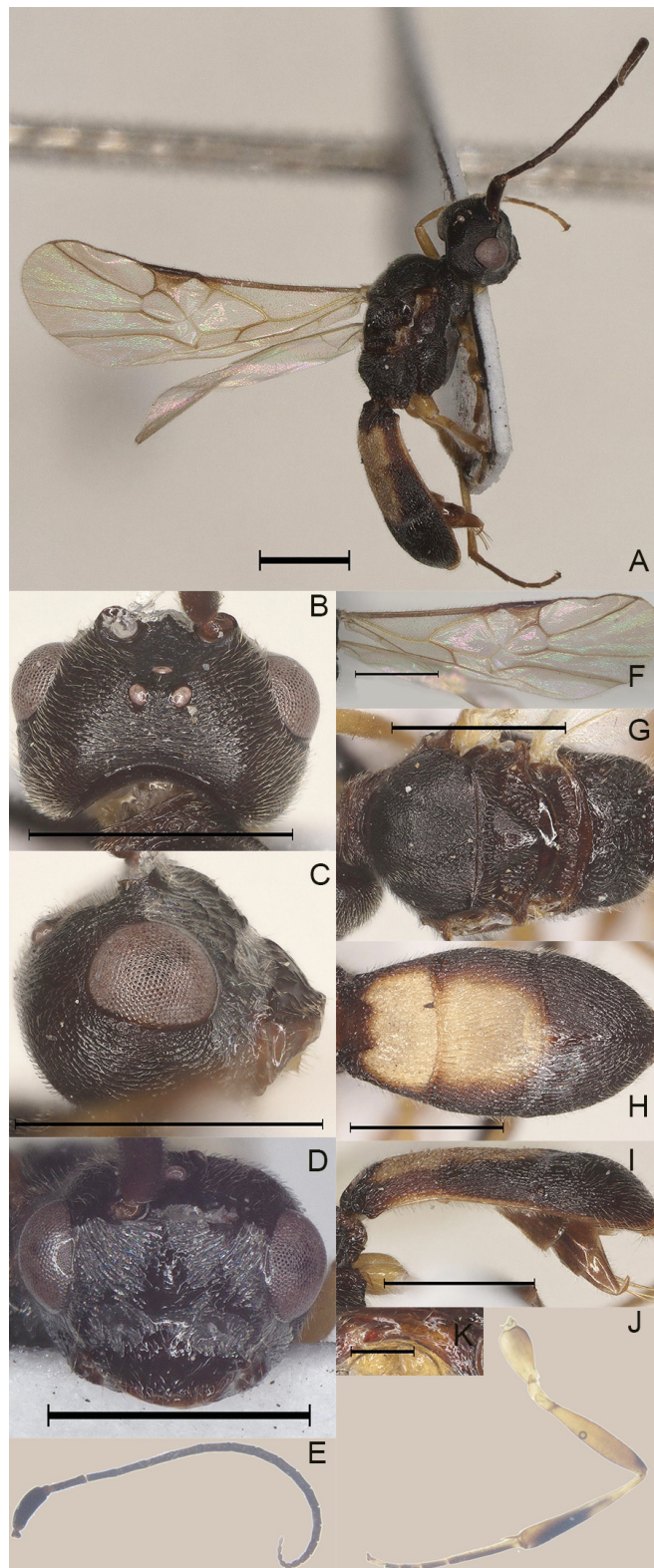


Fig. 21. *Phanerotoma nigricornis* sp. nov., holotype, ♀ (ZJUH No. 200800263). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–D, F–I = 1 mm; K = 0.2 mm (no scale bars for E, J).

LEGS (Fig. 21J). Hind femur slender and with satin sheen, $5.0\times$ as long as wide, hind tibia slender; middle tibia with large pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 21G–H). Carapace elliptical in dorsal view, $1.9\times$ as long as wide and $1.2\times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite $1.1\times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view convex medially, densely and semi-circularly rugose and rounded (Fig. 21H), lateral lamella wide, medio-apically deeply emarginate; ovipositor sheath narrow (Fig. 21G), with some long and erect setae; hypopygium apically acute and with up-curved short and robust triangular protuberance (Fig. 21G).

Male

Unknown.

Host

Unknown.

Distribution

China (Sichuan).

Phanerotoma nigratarsis sp. nov.

urn:lsid:zoobank.org:act:48633829-9941-4729-9274-BD16FE4A4490

Fig. 22

Diagnosis

Vein 2-SR of fore wing straight (Fig. 22F); second submarginal cell of fore wing comparatively slender (Fig. 22F); mesopleuron partly smooth and distinctly shiny; hypopygium with short spine-like protuberance (Fig. 22I); clypeus with two large teeth (Fig. 22D); hind tibia with dark brown patch subbasally and apically (Fig. 22J); vein r almost as long as vein 3-SR; eye $1.2\times$ as wide as temple in lateral view (Fig. 22C); antenna (Fig. 22E) and all tarsi mostly blackish (Fig. 22J).

Etymology

Named after the dark tarsi, from the Latin ‘*niger*’ for ‘black’ and the Greek ‘*tarsos*’ for ‘flat part of foot’.

Type material

Holotype

CHINA – **Xizang Zizhiqu** • ♀; Linzhi, Bomigang Village; 9 Aug. 2019; Pu Tang leg.; ZJUH No. 202300020.

Paratypes (5 ♀♀)

CHINA – **Xizang Zizhiqu** • 1 ♀; Linzhi, Bomigang village; 8 Aug. 2019; Yuanyuan Han leg.; ZJUH No. 202300011 • 1 ♀; Linzhi, Yigong, Baihequ; 4 Aug. 2019; Pu Tang leg.; ZJUH No. 202300019 • 2 ♀♀; Linzhi, Yigong, tea plantation; 3 Aug. 2019; Pu Tang leg.; ZJUH Nos 202300031, 202300032. – **Shaanxi** • 1 ♀; along road from Huangbaiyuan to Taipei; 33°49' N, 107°39' E; elev. 1321 m; 17 Jul. 2015; Jiangli Tan and Qingqing Tan leg.; ZJUH.

Description

Female

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

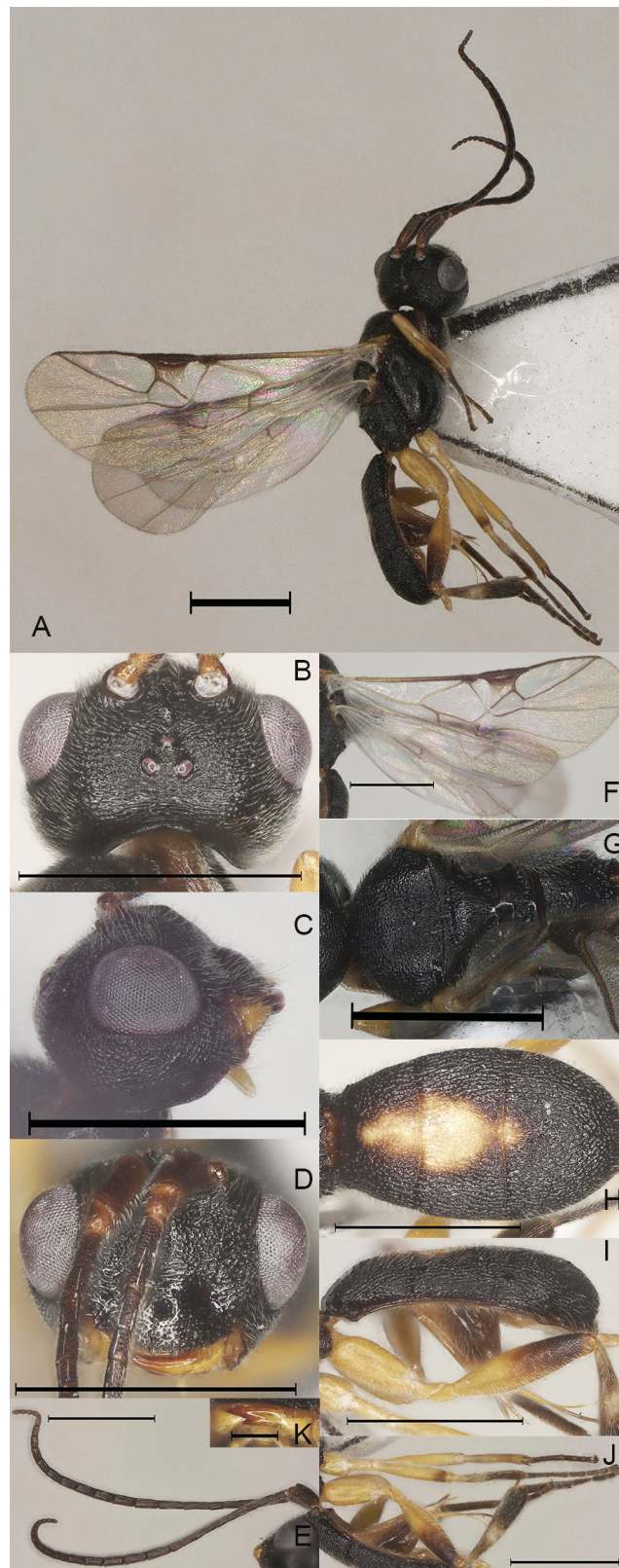


Fig. 22. *Phanerotoma nigratarsis* sp. nov., holotype, ♀ (ZJUH No. 202300020). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J = 1 mm; K = 0.2 mm.

COLOURATION. Black; mandible (except teeth) yellow; teeth of mandible brown; coxae, trochanters, femora (except middle and hind femur apically), middle tibia basally and hind tibia basally and medially, veins M+CU, 1-M, 3-M, and CU1a of fore wing, and metasomal carapace pale-yellow.

HEAD. Width $1.3 \times$ median length in anterior view (Fig. 22D) and part of head above eye in lateral view $0.2 \times$ height of eye (Fig. 22C); antenna with 23 segments, five subapical antennal segments moniliform (Fig. 22E); area of stemmaticum mainly granulate; OOL: diameter of posterior ocellus: POL = 27:6:6; eye as long as temple in dorsal view (Fig. 22B); frons with longitudinal rugae medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face granulate-rugose laterally, transversely rugose medially and without median ridge; clypeus smooth, shiny and $0.8 \times$ minimum width of face, intertentorial distance $1.9 \times$ minimum width between clypeus and eye, long erect setose and with 2 minute teeth medio-ventrally (Fig. 22D); temple in lateral view $1.1 \times$ as wide as temple (Fig. 22C), in anterior view, height of eye $0.7 \times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 22D); malar space $0.9 \times$ as long as basal width of mandible; lower tooth of mandible $0.3 \times$ as long as apical tooth, small and short (Fig. 22K).

MESOSOMA (Fig. 22G). Length $1.6 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 22G); scutellum triangular, flat, distinctly granulate-rugose and rather shiny; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, latero-posteriorly distinct tuberculate, no transverse or median carinae.

WINGS. Fore wing $2.7 \times$ as long as its maximum width; length of 1-R1 $1.3 \times$ as long as pterostigma; r of fore wing $0.6 \times$ 3-SR; distance between 1-R1 and wing apex $0.6 \times$ 1-R1; 2-SR and SR1 nearly straight (Fig. 22F); 2-SR+M present; pterostigma large, parastigma small; 1-CU1 $0.6 \times$ as long as vein 2-CU1, cu-a slightly inclined and $0.5 \times$ as long as 1-CU1; r: 3-SR: SR1 = 10:16:99; 2-SR: 3-SR: r-m = 37:16:11; 2-M straight posteriorly, bent anteriorly (Fig. 22F).

LEGS (Fig. 22J). Hind femur elongate and with satin sheen, $3.7 \times$ as long as wide and rather widened submedially; hind tibia rather swollen and with dark brown patch; middle tibia with rather large pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 22H–I). Carapace elliptical in dorsal view, $1.7 \times$ as long as wide and as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite $1.5 \times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view densely and semi-circularly rugose and truncate (Fig. 22H), lateral lamella wide, with protruding corners latero-apically, medio-apically emarginate; ovipositor sheath narrow (Fig. 22I), with some long and erect setae; hypopygium apically acute and with up-curved medium-sized triangular protuberance (Fig. 22I).

VARIATION. Eye 0.9 – $1.1 \times$ as long as temple; third tergite in dorsal view concave or convex medio-posteriorly, 1.3 – $1.5 \times$ as long as second tergite; hind femur 3.7 – $4.2 \times$ as long as wide.

Male

Unknown.

Host

Unknown.

Distribution

China (Xizang Zizhiqu, Shaanxi).

Phanerotoma offensa Papp, 1989

Fig. 23

Phanerotoma offensa Papp, 1989: 316–318.

Phanerotoma offensa – Tobias 2000: 429.

Diagnosis

Third tergite of metasoma concave medio-posteriorly (Fig. 23G); vein r of fore wing almost in line with vein 3-SR (Fig. 23E); head emarginate medio-posteriorly (Fig. 23B); hypopygium large and robust in lateral view (Fig. 23H); vein cu-a of fore wing vertical; first submarginal cell sparsely setose medially, less setose than second submarginal cell; third tergite rather flat in lateral view; vein 2-SR of fore wing distinctly bent; hind tibia comparatively robust in holotype; OOL $2.2\text{--}2.3\times$ as long as maximum diameter of posterior ocellus (Fig. 23B).

Type material

Holotype

NORTH KOREA – **South Pyongan Province** • ♀; Lyong-ak Mt., 25 km west of Pyongyang; 31 Aug. 1971; S. Horvatovich and J. Papp leg.; No. 224.

Other material examined (4 ♀♀)

CHINA – **Fujian** • 2 ♀♀; Jiangle, Longxi Mt.; 8 Jul. 1991; Changming Liu leg.; ZJUH Nos 969800, 9610033. – **Hubei** • 1 ♀; Zhuxi; 27 May 1979; Liangbing Zong leg.; ZJUH No. 870126. – **Guangdong** • 1 ♀; Fuchuan, Xiawan village; 16 Aug. 2021; Pu Tang leg.; ZJUH No. 202300030.

Host

Unknown.

Distribution

North Korea, China (Fujian, Guangdong, Hubei). China is a new record.

Phanerotoma orientalis Szépligeti, 1902

Fig. 24

Phanerotoma orientalis Szépligeti, 1902: 63.

Phanerotoma flavida Enderlein, 1912: 259. **Syn. nov.**

Phanerotoma orientalis – Shenefelt 1973: 621. — Zettel 1990: 118. — Chen & Ji 2003: 174. — Papp 2004: 192.

Phanerotoma flavida – Shenefelt 1973: 924. — Zettel 1990: 119.

Diagnosis

First discal cell anteriorly comparatively narrow, because of nearly straight vein 1-M and smaller parastigma (Fig. 24F); five subapical segments of female antenna moniliform (Fig. 24E), penultimate segment $1.5\times$ as long as wide; vein cu-a of fore wing $0.5\times$ as long as vein 1-CU1; propodeum coarsely

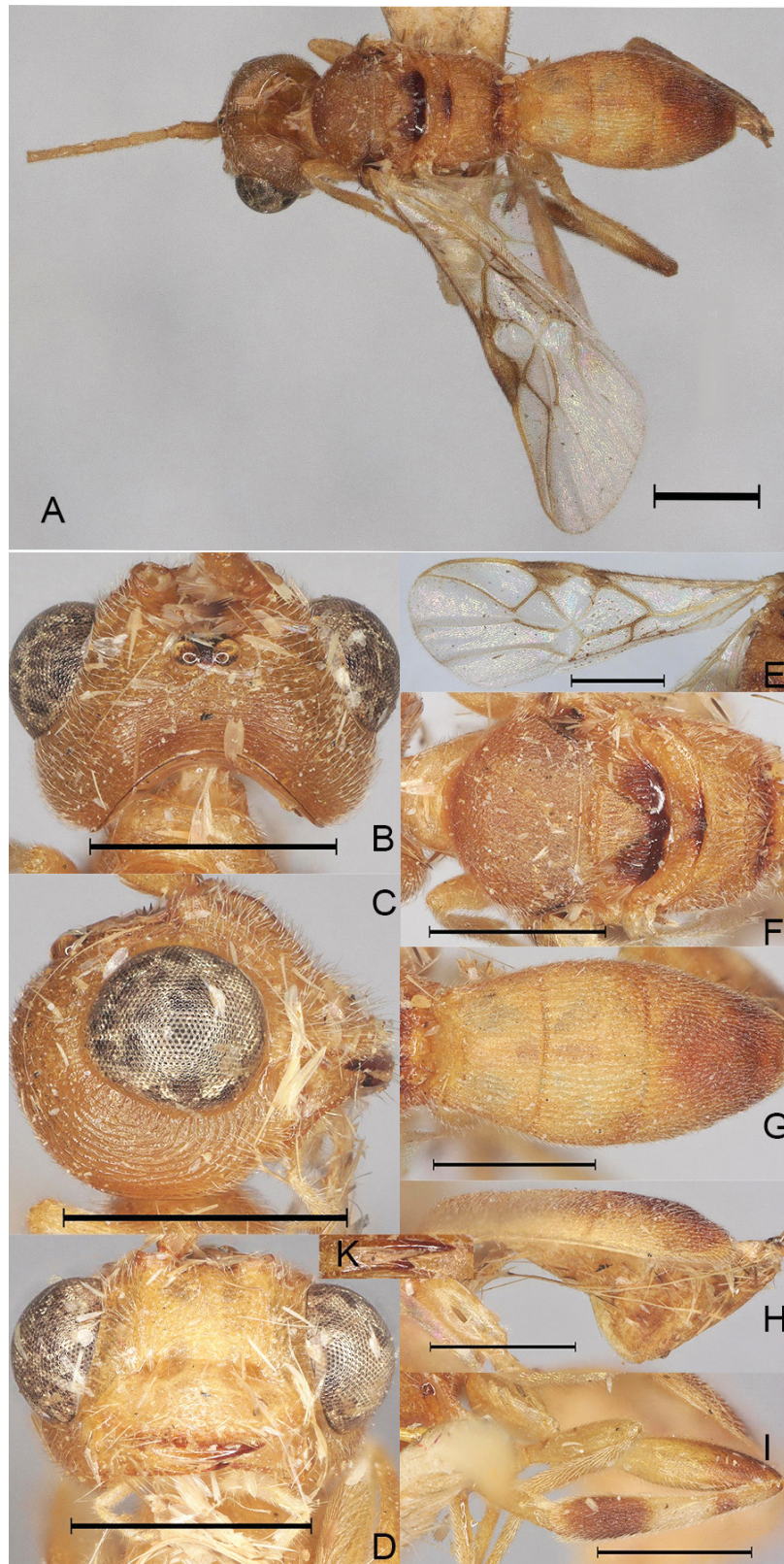


Fig. 23. *Phanerotoma offensa* Papp, 1989, China, Fujian, ♀ (ZJUH No. 969800). **A.** Habitus, dorsal view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Fore wing. **F.** Mesosoma, dorsal view. **G.** First third of metasomal tergites, dorsal view. **H.** Metasoma, lateral view. **I.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–I = 1 mm; K = 0.2 mm.

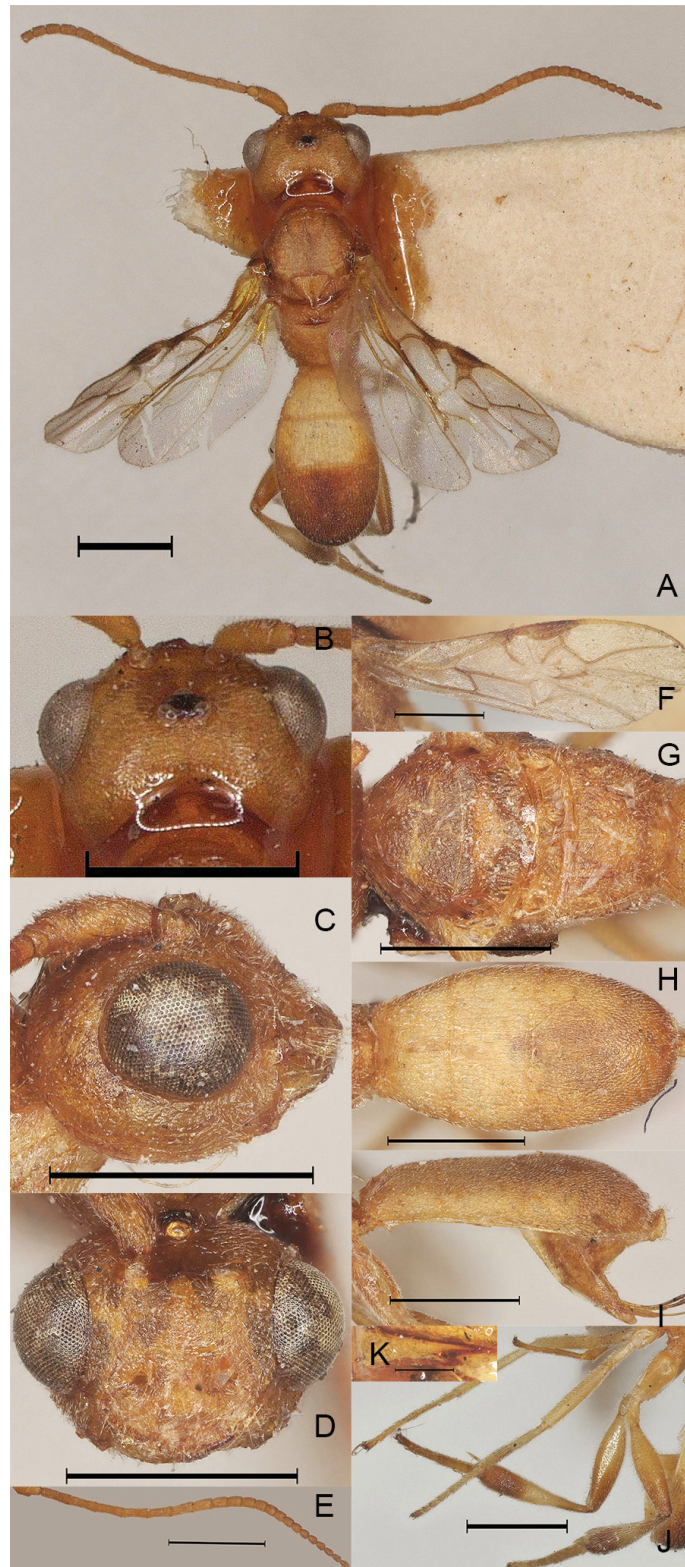


Fig. 24. *Phanerotoma orientalis* Szépligeti, 1902, China, Jiangsu. **A–B, E, J.** ♀ (ZJUH No. 20023349). **C–D, F–I, K.** ♀ (ZJUH No. 816208). **A.** Habitus, dorsal view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J = 1 mm; K = 0.2 mm.

reticulate-rugose (Fig. 24G), and latero-posteriorly tuberculate; OOL 4.0–4.8× as long as maximum diameter of posterior ocellus (Fig. 24B).

Type material

Lectotype of *Phanerotoma orientalis*

MALAYSIA • ♀; Kuala Lumpur; No. 558, designated by J. Papp in 1974.

Other material examined (53 ♀♀, 19 ♂♂)

CHINA – **Fujian** • 1 ♀; Yongtai, Qingtai Mt.; 18 Sep. 2002; Desong Yuan leg.; ZJUH No. 20023349. – **Shaanxi** • 1 ♀; Yunmeng; 34°18' N, 110°5' E; elev. 1211 m; 9 Jul.–9 Sep. 2017; Jiangli Tan leg.; ZJUH • 1 ♀; Qinling Niubeiliang Nature Reserve; 26 Jul. 2013; Jiangli Tan leg.; ZJUH No. 201302573LT. – **Shandong** • 1 ♀; Taian; 1962; ZJUH No. 62006.5 • 1 ♀; Qingdao; 2 Aug. 1995; Ping Cai leg.; ZJUH No. 958198. – **Zhejiang** • 1 ♀; Hangzhou; 9 Aug. 1932; Ruzuo Zhu leg.; ZJUH • 10 ♀♀; same data as for preceding; 4 Jun.–30 Jul. 1933; Ruzuo Zhu leg.; ZJUH • 1 ♀; same data as for preceding; 24 May 1934; Ruzuo Zhu leg.; ZJUH • 3 ♀♀; same data as for preceding; Jun.–Aug. 1934; Ruzuo Zhu leg.; ZJUH • 7 ♀♀; same data as for preceding; 3 Sep.–23 Oct. 1935; Ruzuo Zhu leg.; ZJUH • 1 ♀; same data as for preceding; 1 Sep. 1936; Ruzuo Zhu leg.; ZJUH • 1 ♂; same data as for preceding; 31 Oct. 1936; Ruzuo Zhu leg.; ZJUH • 1 ♀; same data as for preceding; 17 Sep. 1954; Ruzuo Zhu leg.; ZJUH No. 65024.1 • 3 ♀♀; same data as for preceding; 10 Jun.–12 Aug. 1957; Chuanlu Liu and Cui Hu leg.; ZJUH Nos 5770.8, 5773.10, 5781.2 • 1 ♀; same data as for preceding; 2 Jul. 1958; Junhua He leg.; ZJUH No. 5861.5 • 1 ♀; same data as for preceding; 2 Sep. 1958; Cui Hu leg.; ZJUH No. 5871.4 • 1 ♂; same data as for preceding; 28 May 1957; Zhengnan Zhou leg.; ZJUH No. 5850.a3 • 5 ♀♀; same data as for preceding; ZJUH Nos 5850.3b to 5850.3f • 1 ♀; same data as for preceding; 1965; ZJUH No. 65047.24 • 1 ♂; Tianmu Mt.; 4 Aug. 1998; Mingshui Zhou leg.; ZJUH No. 20000273 • 1 ♀; same data as for preceding; May 1933; Ruzuo Zhu leg.; ZJUH • 1 ♂; same data as for preceding; 1–2 Jul. 2005; Xuexin Chen leg.; ZJUH No. 200601525 • 3 ♀♀; Huangyan; Aug.–Oct. 1934; Ruzuo Zhu leg.; ZJUH • 2 ♀♀; Anji, Longwang Mt.; 20 Sep. 2004; Xuexin Chen leg.; ZJUH Nos 20050004, 20050007. – **Jiangsu** • 1 ♀; Yixing; 3 Jun. 1935; Ruzuo Zhu leg.; ZJUH – **Jiangxi** • 5 ♂♂; Nanchang; 20 May 1993; Genxiang Zan leg.; ZJUH No. 9310849a to 9310849e • 1 ♀; Jiujiang; 29 Aug. 1981; Jinguang Zhang leg.; ZJUH No. 816208. – **Anhui** • 1 ♀; Yuexi; 24 Sep. 1981; Fuan Yang leg.; ZJUH No. 820576. – **Sichuan** • 1 ♀; Chengdu; 1979; Rongrong He leg.; ZJUH No. 801610 • 1 ♀; Yaan; elev. 800 m; 18 Jun. 1966; Yuzhou Du leg.; ZJUH No. 977755. – **Chongqing** • 3 ♂♂; Jun. 1988; Jianqiang Zhang leg.; ZJUH Nos 880622a to 880622c • 1 ♀; same data as for preceding; ZJUH No. 880622d. – **Guangxi Zhuangzu Zizhiqu** • 1 ♀; Nanning; elev. 350 m; 10 Sep. 1983; Qingping Chen leg.; ZJUH No. 860828 • 1 ♂; Shangxi; elev. 350 m; 10 Jun. 2000; Hong Wu leg.; ZJUH No. 200100120 • 1 ♂; Longzhou, Nonggang; 20 May 1982; Junhua He leg.; ZJUH No. 824400 • 1 ♀; Longzhou, Nonggang; 20–23 May 1982; Junhua He leg.; ZJUH No. 821630 • 1 ♂; Longzhou, Nonggang; 20–23 May 1982; Junhua He leg.; ZJUH No. 821671. – **Hainan** • 1 ♂; Yaxian; Oct. 1966; Junhua He leg.; ZJUH No. 73017.9 • 1 ♀; Ledong, Jianfengling; 9 May 2008; Jingxian Liu leg.; ZJUH No. 20080091 • 2 ♂♂; Ledong, Jianfengling; 9 May 2008; Jingxian Liu leg.; ZJUH Nos 200800090, 200800147 • 1 ♂; Wuzhi Mt.; 16 May 2007; Jie Zeng leg.; ZJUH No. 200705100 • 1 ♀; same data as for preceding; ZJUH No. 200705127 • 1 ♀; Wuzhi Mt.; 16 May 2007; Jie Zeng leg.; ZJUH No. 200705106 • 1 ♀; Yinggeling; 23 May 2007; Jingxian Liu leg.; ZJUH No. 200702328. – **Yunnan** • 1 ♂; Simao; 1982; Shiqing Yi leg.; ZJUH No. 826882a • 1 ♀; same data as for preceding; ZJUH No. 826882b.

Hosts

Conogethes punctiferalis (Guenée, 1854) (Crambidae), *Diaphania pyloalis* (Walker, 1859) (Pyralidae), *Haritalodes derogata* (Fabricius, 1775) (Crambidae).

Distribution

Indonesia, Malaysia, Philippines, Singapore, China (Anhui, Fujian, Shaanxi, Shandong, Zhejiang, Jiangsu, Jiangxi, Sichuan, Chongqing, Guangxi Zhuangzu Zizhiqu, Hainan, Yunnan).

Remarks

Zettel (1990) synonymised *P. philippinensis* Ashmead, 1904, with *P. orientalis*, but this synonymy is not accepted here because the holotype has a distinct lateral propodeal tubercle (absent in *P. orientalis*), the 10th antennal segment of the female is as long as wide (longer than wide in *P. orientalis*) and the hypopygium is without a distinct triangular prolongation (with short triangular prolongation in *P. orientalis*).

Phanerotoma flavida Enderlein, 1912, is a new synonym of *P. orientalis* Szépligeti, 1900, based on photos of the lectotype of *P. flavida* kindly supplied by Mr Andrew Liston (Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany) and of the lectotype of *P. orientalis* supplied by Dr Zoltán Vas (Hungarian Museum of Natural History, Budapest, Hungary). Zettel (1990) used only one variable character for their separation (vein 3-SR of fore wing less than $3.5 \times$ as long as vein r in *P. flavida* [= vein r more than $0.25 \times$ vein 3-SR] and at least $4.0 \times$ as long as vein r in *P. orientalis* [= vein r at most $0.25 \times$ vein 3-SR]), which is obviously insufficient to separate very similar species.

Phanerotoma ovatipeltata sp. nov.

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Fig. 25

Diagnosis

Ovipositor sheath robust (Fig. 25L); second metasomal suture straight (Fig. 25J); third metasomal tergite $1.4 \times$ as long as second tergite, in dorsal view densely and semi-circularly rugose and posteriorly weakly emarginate; malar space $0.8 \times$ as long as basal width of mandible (Fig. 25E).

Etymology

Named after the oval shape of the metasomal carapace, from the Latin '*ovatus*' for 'egg-shaped' and '*pelta*' for 'shield'.

Type material

Holotype

CHINA – Zhejiang • ♀; Tianmu Mt.; 22 Jul. 1987; Xiaoming Lou leg.; ZJUH No. 874592.

Paratypes (15 ♀♀, 16 ♂♂)

CHINA – Zhejiang • 1 ♀; same data as for holotype; 20–22 Jul. 1987; Xuexin Chen leg.; ZJUH No. 872151 • 4 ♀♀; same data as for holotype; 2–3 Sep. 1987; Xuexin Chen and Xingeng Wang leg.; ZJUH Nos 876765, 876770, 877472, 877473 • 1 ♂; same data as for holotype; 27 Jul. 1988; Ying Qian leg.; ZJUH No. 940358 • 1 ♀; same data as for holotype; 1 Jul. 2001; Xuexin Chen leg.; ZJUH No. 20032384 • 10 ♂♂; same data as for holotype; 20–22 Jul. 1987; Xuexin Chen and Xiaoming Lou leg.; ZJUH Nos 872095, 872150, 873509, 874524, 874528, 874531, 874574, 874584, 874592, 874630 • 1 ♀; same data as for holotype; ZJUH No. 874554 • 1 ♂; Xianrending of Tianmu Mt.; 23 Jul. 1993; Mingshui Zhao leg.; ZJUH No. 991974 • 1 ♀; same data as for preceding; ZJUH No. 991918 • 1 ♂; same data as for preceding; 18 Aug. 1998; Yun Ma and Yafen Yang leg.; ZJUH No. 998040 • 1 ♀; same data as for preceding; 29 Jul. 1998; Yongming Zhao leg.; ZJUH No. 993635 • 1 ♀; same data as for preceding; 26 Jul. 1998; Yongming Zhao leg.; ZJUH No. 200002878 • 1 ♀; same data as for preceding; 20 Aug.

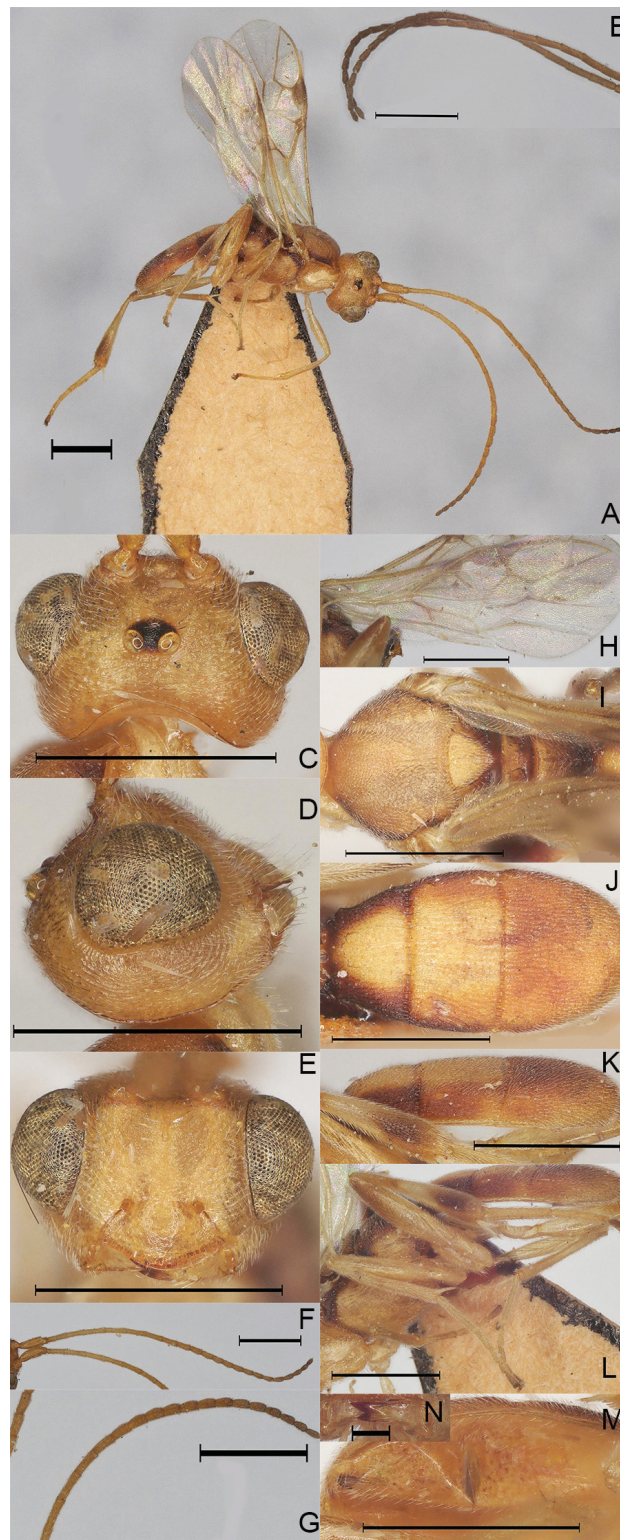


Fig. 25. *Phanerotoma ovatipeltata* sp. nov. **A, C–N.** Holotype, ♀ (ZJUH No. 874592). **B.** Paratype, ♂ (ZJUH No. 940358). **A.** Habitus, lateral view. **B.** Apical antenna, lateral view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Antenna, lateral view. **G.** Apical antenna, lateral view. **H.** Fore wing. **I.** Mesosoma, dorsal view. **J.** First third of metasomal tergites, dorsal view. **K.** Metasoma, lateral view. **L.** Hind leg. **M.** Metasoma, ventral view. **N.** Mandible, ventral view. Scale bars: A–M=1 mm; N=0.2 mm.

1999; Yongming Zhao leg.; ZJUH No.200010856 • 2 ♂♂; Hangzhou; 27–31 May 1957; Cui Hu leg.; ZJUH No. 5771.15 • 1 ♀; Anji, Longwang Mt.; 31 Aug. 1993; Chunyan Zhu leg.; ZJUH No. 939994 • 1 ♀; Linan, Qingliangfeng; 3 Jul. 2008; Junhua He leg.; ZJUH.

Description

Female

MEASUREMENTS. Length of body 4.4 mm, of fore wing 4.1 mm.

COLOURATION. Yellow; stemmaticum, teeth of mandible, first tergite of metasoma apically and laterally, side of scutellum, metanotum (except medially), propodeum posteriorly, hind tibia apically, pterostigma and parastigma dark brown; hind femur apically, hind tibia basally, second tergite laterally and third tergite yellowish brown.

HEAD. Width $1.4 \times$ median length in anterior view (Fig. 25E) and part of head above eye in lateral view $0.2 \times$ height of eye (Fig. 25D); antenna with 23 segments, $1.3 \times$ as long as fore wing, 13th–23rd segments widened subapically because of small round protuberances (Fig. 25F–G); area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=25:10:6; eye $1.7 \times$ as long as temple in dorsal view (Fig. 25C); frons with oblique rugae medially, rugose laterally and without median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face with oblique rugae laterally, transversely rugose medially and with indistinct median carina; clypeus smooth, shiny and $0.8 \times$ minimum width of face, intertentorial distance $1.5 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 teeth medio-ventrally, but medial tooth indistinct (Fig. 25E); eye large, in lateral view $1.6 \times$ as wide as temple (Fig. 25D), in anterior view its height $0.8 \times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 25E); malar space $0.8 \times$ as long as basal width of mandible; lower tooth of mandible $0.5 \times$ length of apical tooth, large and robust (Fig. 25N).

MESOSOMA (Fig. 25I). Length $1.6 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus moderately wide (Fig. 25I); scutellum wide, triangular, flat, distinctly granulate-rugose and rather shiny; metanotum without median carina anteriorly and tooth posteriorly; propodeum coarsely reticulate-rugose, not tuberculate, no transverse or median carinae.

WINGS. Fore wing $2.6 \times$ as long as its maximum width; length of 1-R1 $1.3 \times$ as long as pterostigma; r of fore wing $0.5 \times$ 3-SR; distance between 1-R1 and wing apex $0.5 \times$ 1-R1; 2-SR straight (Fig. 25H); SR1 straight; 2-SR+M present; pterostigma large, parastigma large; 1-CU1 $0.4 \times$ as long as vein 2-CU1, cu-a slightly inclined and $0.6 \times$ as long as 1-CU1; r:3-SR:SR1=123:269:988; 2-SR:3-SR:r-m=419:269:175; 2-M straight posteriorly, bent anteriorly (Fig. 25H).

LEGS (Fig. 25L). Hind femur elongate, slender and with satin sheen, $4.1 \times$ as long as wide and slightly widened submedially; hind tibia rather swollen; middle tibia with large pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Figs 25J, M, 25K). Carapace oval in dorsal view, $1.8 \times$ as long as wide and as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture wide and straight; third tergite $1.4 \times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view convex medially, densely and semi-circularly rugose and rounded (Fig. 25J), lateral lamella wide, with protruding corners latero-apically and weakly emarginate; ovipositor sheath robust and short (Fig. 25M), with some long and erect setae; hypopygium apically acute, but without triangular protuberance (Fig. 25M).

VARIATION. Length of fore wing 3.3–4.1 mm; eye in lateral view 1.6–1.8 × as long as temple; lower tooth of mandible 0.3–0.5 × as long as apical tooth; 1-R1 1.3–1.5 × as long as pterostigma.

Male

Very similar to female, but 13th–22nd segments of antennae cylindrical (Fig. 25B).

Host

Unknown.

Distribution

China (Zhejiang).

***Phanerotoma potanini* Kokujev, 1895**

Phanerotoma potanini Kokujev, 1895: 94.

Phanerotoma potanini – Shenefelt 1973: 924. — Tobias 2000: 427.

Diagnosis

Antenna with 25–27 segments; head in anterior view strongly convex posteriorly; vein cu-a of fore wing 2.5 × as long as vein 1-CU1; marginal cell of fore wing comparatively small; scapus strongly swollen, about 3 × as wide as following antennal segments.

Host

Unknown.

Distribution

Mongolia, China (Shanxi).

***Phanerotoma producta* Watanabe, 1937**

Fig. 26

Phanerotoma producta Watanabe, 1937: 81.

Phanerotoma producta – Shenefelt 1973: 924. — Tobias 2000: 430.

Diagnosis

Third tergite of metasoma 1.4 × as long as second tergite, distinctly convex medio-posteriorly in dorsal view (Fig. 26G); hypopygium apically with medium-sized and robust protuberance (Fig. 26H); ovipositor sheath normal, not needle-shaped; clypeus with three large and robust teeth medio-ventrally (Fig. 26D); head rather emarginate medio-posteriorly; face semi-circularly rugose; penultimate antennal segment of female as long as wide in lateral view (Fig. 26J); eye medium-sized, eye 1.4 times temple in dorsal view; second metasomal suture rather curved; lower tooth of mandible small and robust (Fig. 26K); five subapical antennal segments of female small and moniliform (Fig. 26J); hind tibia usually with faint brownish subbasal patch and widened medially (Fig. 26I); vein 1-CU1 of fore wing 0.5–0.6 × as long as vein 2-CU1 (Fig. 26E). Note. The interpretation of *P. producta* is based on the original description (including a schematic drawing of the metasoma).

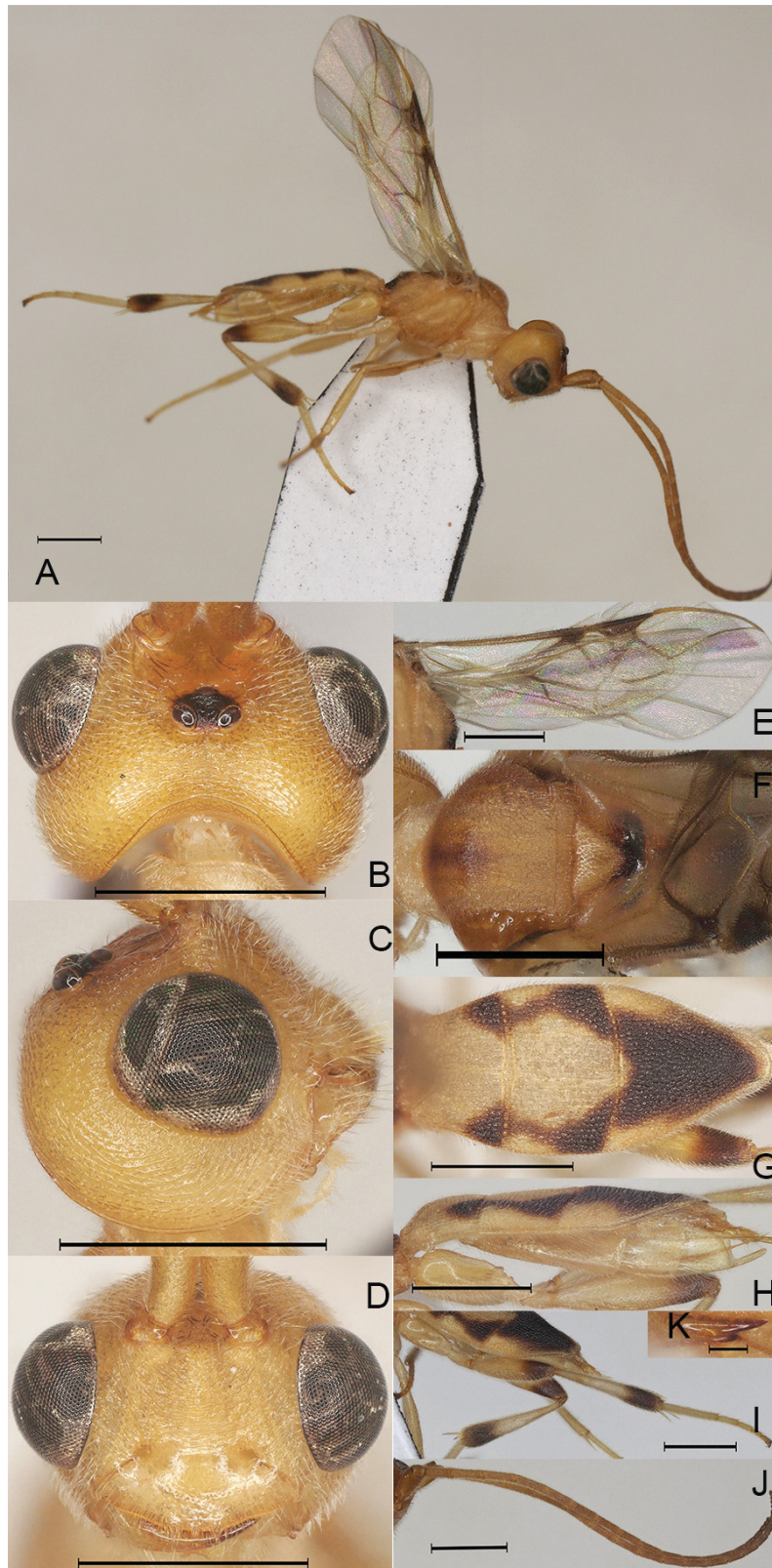


Fig. 26. *Phanerotoma producta* Watanabe, 1937, China, Taiwan, ♀ (ZJUH No. 202300108). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Fore wing. **F.** Mesosoma, dorsal view. **G.** First third of metasomal tergites, dorsal view. **H.** Metasoma, lateral view. **I.** Hind leg. **J.** Antenna, lateral view. **K.** Mandible, ventral view. Scale bars: A–J = 1 mm; K = 0.2 mm.

Type material

JAPAN – **Hokkaido** • 1 ♀; Sapporo; 28 Jul. 1926; Shonen Matsumura leg.; Hokkaido University, Faculty of Agriculture, Entomological Institute, Sapporo, Japan.

Other material examined (12 ♀♀, 3 ♂♂)

CHINA – **Jilin** • 1 ♀; Dongliao; 22–31 Jul. 1988; Xiaoming Lou leg.; ZJUH No. 888126 • 1 ♀; Longtan Mt.; 21 Jul. 1996; Juxian Lou leg.; ZJUH No. 961861. – **Liaoning** • 1 ♂; Qian Mt.; 13 Aug. 1994; Congli Wang leg.; ZJUH No. 948349. – **Shaanxi** • 1 ♂; Zhouzhi, Houzhenzi; 33°31' N, 107°59' E; elev. 836 m; 26 Aug. 2013; Bingbing Xu leg.; ZJUH No. 201300427LT • 5 ♀♀; same data as for preceding; ZJUH Nos 201300423LT to 201300426LT, 201300428LT • 1 ♀; Foping; elev. 950 m; 23 Jul. 1998; Jian Yao leg.; IZCAS IOZ(E) 200104856. – **Ningxia Huizu Zizhiqu** • 3 ♀♀; Huoditang; elev. 1580 m; 15 Aug. 1998; Decheng Yuan leg.; IZCAS IOZ(E) 200104805, 200104858, 200104859. – **Zhejiang** • 1 ♂; Lingan, Qingliangfeng; 11 Aug. 2005; Hongying Zhang leg.; ZJUH No. 200603450. – **Taiwan** • 1 ♀; Kaohsiung, Zi Mt.; 2005–2009; ZJUH No. 202300108. – **Gansu** • 1 ♀; Kangxian, Heimaguan; elev. 1450–1550 m; 13 Jul. 1998; Jian Yao leg.; IZCAS IOZ(E) 200104840.

Host

Unknown.

Distribution

Japan, Korea, Russia, China (Jilin, Liaoning, Shaanxi, Zhejiang, Gansu, Taiwan, Ningxia Huizu Zizhiqu). China is a new record.

Phanerotoma quadratimaculata sp. nov.

urn:lsid:zoobank.org:act:BBACE3B2-9CCC-4E37-817F-75B6ABE94AC9

Fig. 27

Diagnosis

Pterostigma $2.5\times$ as long as wide (Fig. 27F); third tergite of metasoma concave medio-apically (Fig. 27H); hypopygium with up-curved, medium-sized and wide triangular protuberance (Fig. 27I).

Etymology

Named after the nearly quadrate brown patch on the mesoscutum medially, from the Latin ‘*quadrus*’ for ‘four’ and ‘*macula*’ for ‘spot’.

Type material

Holotype

CHINA – **Liaoning** • ♀; Liaoning Laotudingzi Guojiaji Ziran Baohuqu; 16–19 Jul. 2011; Huayan Chen leg.; ZJUH No. 202029863.

Paratype

CHINA – **Zhejiang** • 1 ♀; Anji, Longwang Mt.; 20 Sep. 2004; Belok. leg.; ZJUH No. 20050020.

Description

Female

MEASUREMENTS. Length of body 3.2 mm, of fore wing 2.6 mm.

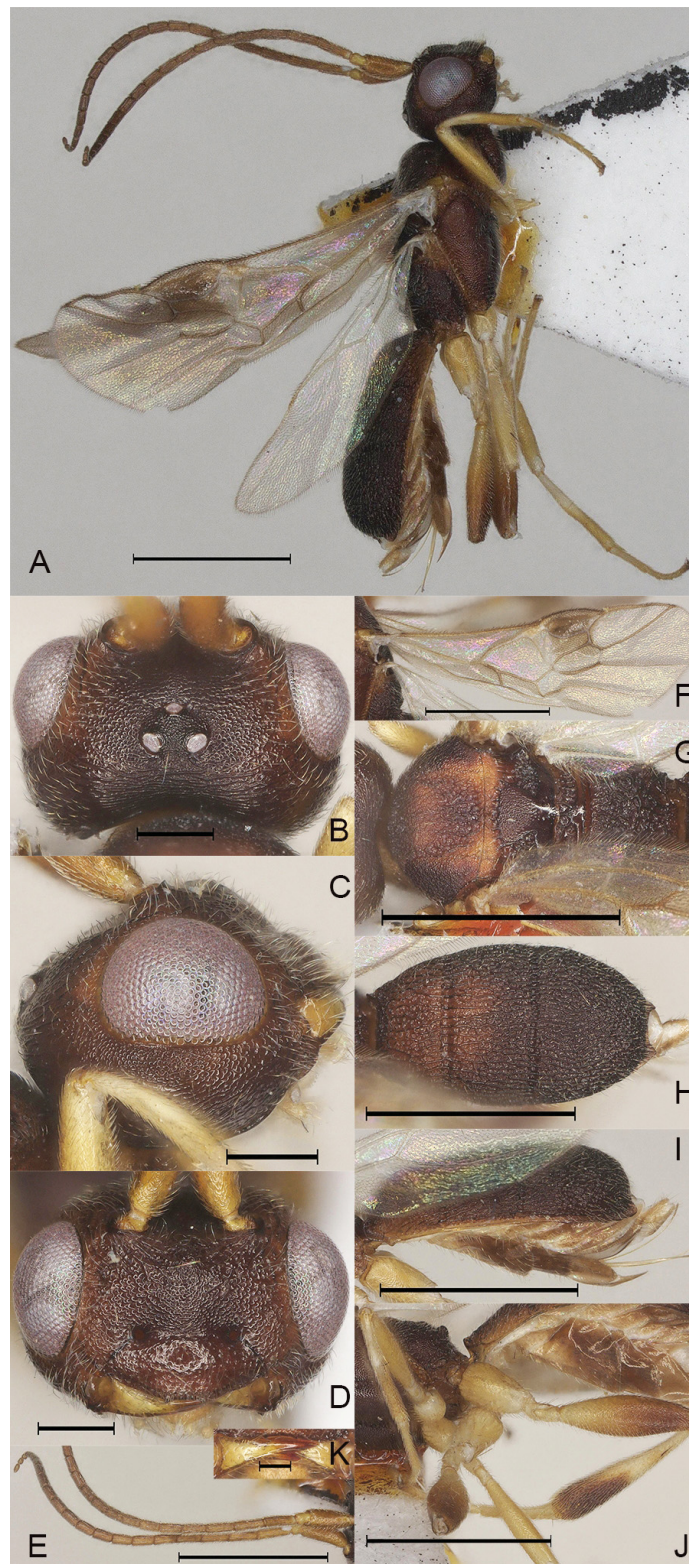


Fig. 27. *Phanerotoma quadratimaculata* sp. nov., holotype, ♀ (ZJUH No. 202029863). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A, E–J=1 mm; B–D=0.2 mm; K=0.1 mm.

COLOURATION. Black; antenna, mandible without teeth, all legs except hind tibia and femur apically, parastigma, veins 1-M, M+CU and 1-SR+M of fore wing, and ovipositor sheath pale-yellow; mesonotum medially, scutellar sulcus and teeth of mandible brown; entire first and second tergites dark brown.

HEAD. Width $1.4 \times$ median length in anterior view (Fig. 27D) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 27C); antenna with 23 segments, three subapical segments moniliform, (Fig. 27E); area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=24:6:7; eye $1.2 \times$ as long as temple in dorsal view (Fig. 27B); frons with oblique rugae medially, rugose laterally and without median ridge; vertex granulate-rugose and with satin sheen; temple punctate-rugose apically and striate basally, with satin sheen; face granulate-rugose and without median carina; clypeus smooth, shiny and $0.8 \times$ minimum width of face, intertentorial distance $1.9 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 2 teeth medio-ventrally (Fig. 27D); temple large, in lateral view $1.2 \times$ as wide as temple (Fig. 27C), in anterior view its height $0.7 \times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 27D); malar space short, $0.7 \times$ as long as basal width of mandible; lower tooth of mandible $0.3 \times$ length of apical tooth, short and robust (Fig. 27K).

MESOSOMA (Fig. 27G). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 27G); scutellum wide, triangular, flat, distinctly granulate-rugose and rather shiny; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, latero-posteriorly distinct tuberculate and no transverse or median carinae.

WINGS. Fore wing $3.0 \times$ as long as its maximum width; marginal cell medium-sized, length of 1-R1 as long as pterostigma; r of fore wing as long as 3-SR; distance between 1-R1 and wing apex $0.6 \times$ 1-R1; 2-SR bent (Fig. 27F); SR1 bent; 2-SR+M present; pterostigma large and parastigma small; 1-CU1 $0.5 \times$ as long as vein 2-CU1, cu-a slightly inclined and $0.7 \times$ as long as 1-CU1; r:3-SR:SR1=10:10:68; 2-SR:3-SR:r-m=37:10:14; 2-M bent (Fig. 27F).

LEGS (Fig. 27J). Hind femur with satin sheen, $3.0 \times$ as long as wide and distinctly widened submedially; hind tibia rather swollen; middle tibia with medium-sized pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 27H–I). Carapace elliptical in dorsal view, $1.7 \times$ as long as wide and $1.1 \times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture wide; third tergite $1.4 \times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view densely and semi-circularly rugose and truncate (Fig. 27H), lateral lamella wide, with protruding corners latero-apically and with deep emargination; ovipositor sheath narrow and long (Fig. 27I), with some long and erect setae; hypopygium apically acute and with medium-sized up-curved triangular protuberance (Fig. 27I).

Male

Unknown.

Host

Unknown.

Distribution

China (Liaoning, Zhejiang).

***Phanerotoma semenowi* Kokujev, 1900**

Fig. 28

Phanerotoma semenowi Kokujev, 1900: 32.

Phanerotoma semenowi – Shenefelt 1973: 926. — Tobias 1986: 295 (lectotype designation); 2000: 427. — van Achterberg 1990: 58.

Diagnosis

Third metasomal tergite largely smooth; scapus comparatively wide in lateral view (van Achterberg 1990: fig. 222); second submarginal cell of fore wing slender, vein 2-SR of fore wing $4.7 \times$ vein r (Fig. 28F); metasomal carapace elliptical in dorsal view (Fig. 28H), about twice as long as wide; medial length of third tergite about $1.8 \times$ medial length of second tergite, with apical lamella hyaline and its margin finely serrate posteriorly; length of malar space about $1.2 \times$ basal width of mandible (Fig. 28D); clypeus with three comparatively large and robust teeth medio-ventrally; POL as long as maximum diameter of posterior ocellus (Fig. 28B).

Type material

Lectotype

TURKMENISTAN • ♀; Repetek; 13 May 1889; A. Semenov leg.; design. Tobias 1981.

Other material examined

CHINA – Ningxia Huizu Zizhiqu • 1 ♀; Yinchuan; 8 Sep. 1983; Wenzhong Xu leg.; ZJUH No. 840997.

Host

Unknown.

Distribution

Spain, Kazakhstan, Mongolia, Russia, Turkmenistan, Ukraine, China (Ningxia Huizu Zizhiqu). China is a new record.

***Phanerotoma sponsa* Ji & Chen, 2002**

Fig. 29

Phanerotoma sponsa Ji & Chen, 2002: 160–161.

Phanerotoma ejuncidus Chen & Ji, 2003: 161–163. **Syn. nov.**

Diagnosis

Head dark brown or blackish and mesosoma yellow (Fig. 29B, G); POL $0.7 \times$ as long as diameter of posterior ocellus (Fig. 29B); maximum width of pterostigma about $1.6 \times$ vein 3-SR (Fig. 29F); apical half of middle tibia brown (Fig. 29E); apical half of antenna infusate or dark brown and second metasomal tergite dark brown or largely so (Fig. 29H); OOL $3.3\text{--}5.0 \times$ diameter of posterior ocellus (Fig. 29B); about 6 subapical antennal segments of female moniliform and minute (Fig. 29E); triangular prolongation of hypopygium of female rather slender and about as long as second segment of hind tarsus (Fig. 29I). The Fujian holotype of *P. ejuncida* is a freak male without vein r of the fore wing and, therefore, synonymised with *P. sponsa*.

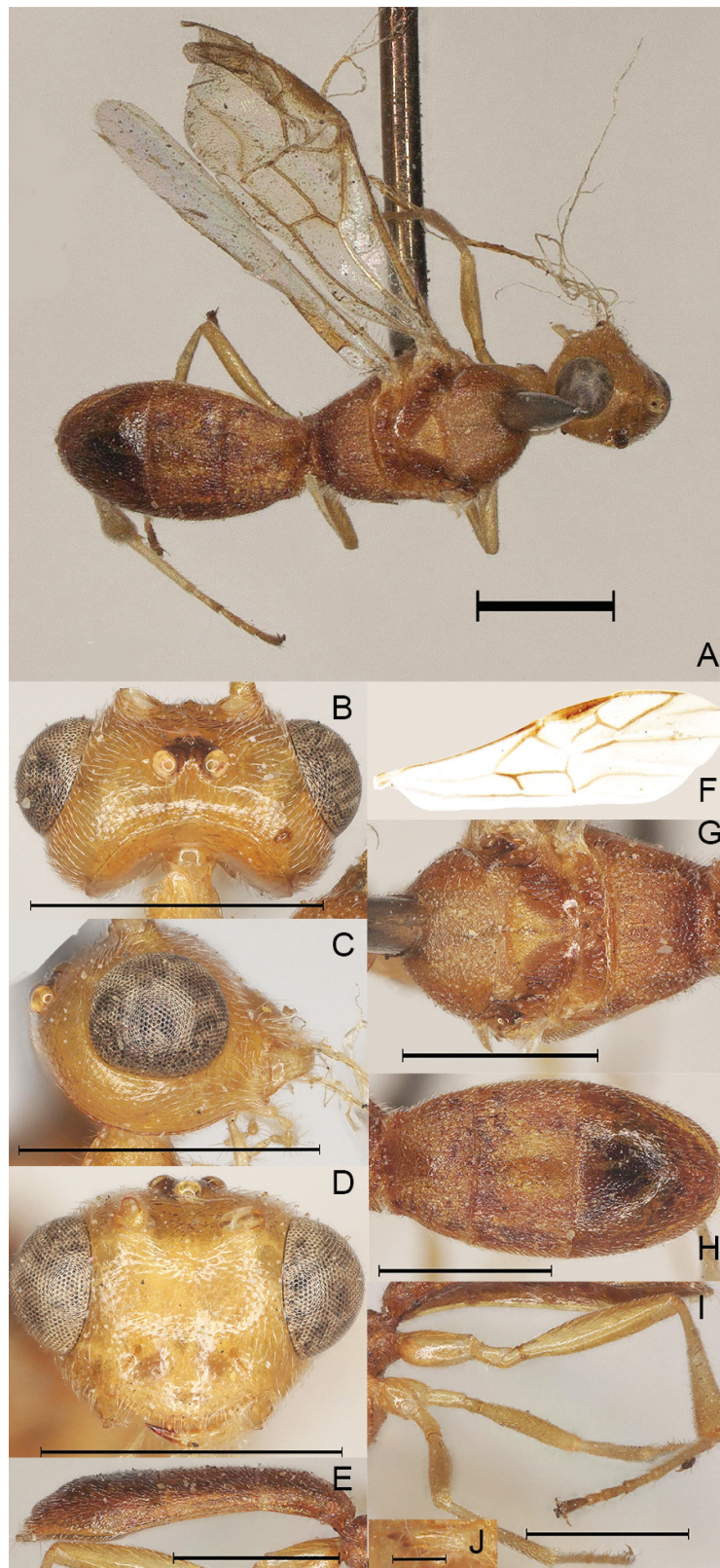


Fig. 28. *Phanerotoma semenowi* Kokujev, 1900, China, Ningxia Huizu Zizhiqu, ♀ (ZJUH No. 840997). A. Habitus, lateral view. B. Head, dorsal view. C. Head, lateral view. D. Head, anterior view. E. Metasoma, lateral view. F. Fore wing. G. Mesosoma, dorsal view. H. First third of metasomal tergites, dorsal view. I. Hind leg. J. Mandible, ventral view. Scale bars: A–E, G–I = 1 mm; J = 0.2 mm (no scale bar for F).

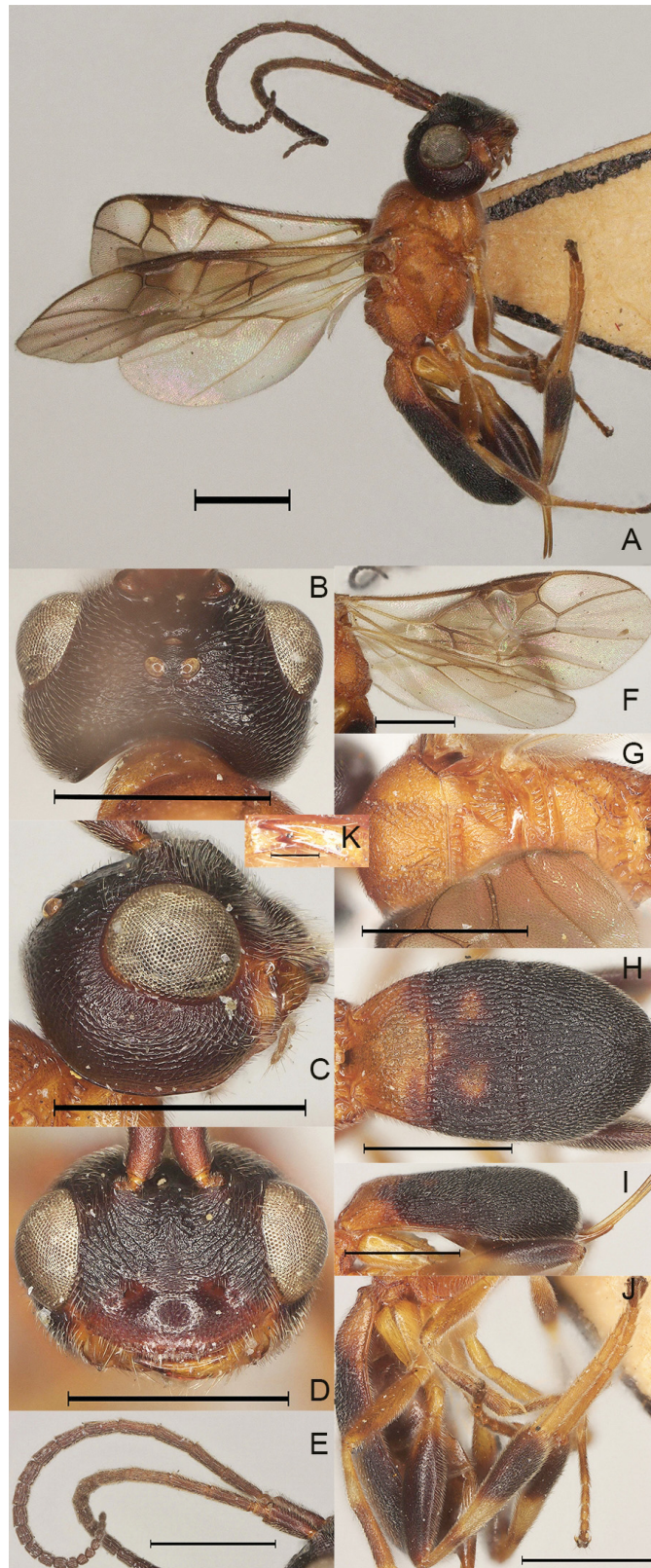


Fig. 29. *Phanerotoma sponsa* Ji & Chen, 2002, China, Fujian, ♀ (ZJUH No. 943032). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

Type material

Holotype of *Phanerotoma sponsa*

CHINA – **Fujian** • ♀; Huanggang Mt.; 2 Aug. 1988; Baobin Guan leg.; Fujian Agriculture & Forestry University, Institute of Beneficial Insects, Fuzhou, Fujian, China.

Other material examined (27 ♀♀, 42 ♂♂)

CHINA – **Jilin** • 1 ♀; Tonghua; 5 Sep. 1992; Juxian Lou leg.; ZJUH No. 976865. – **Henan** • 1 ♀; Neixiang, Baotianman; 13–15 Jul. 1998; Yun Ma leg.; ZJUH No. 987299 • 1 ♀; Shuanglongwan; 33°59' N, 110°49' E; elev. 890 m; 13–14 Jul. 2015; Jiangli Tan leg.; NWUX. – **Hainan** • 1 ♂; Jigong Mt.; May 2000; Ping Cai leg.; ZJUH No. 200101817 • 4 ♀♀; Yinggelin; 25 Aug. 2005; Liusheng Chen leg.; ZJUH Nos 200611290, 200611291, 200611298, 200611299. – **Zhejiang** • 1 ♀; Linan; Tianmu Mt.; 9 Oct. 1982; Kunyan Zhu leg.; ZJUH No. 826012 • 7 ♂♂; Linan; Qingliangfeng; 8–12 Aug. 2005; Hongying Zhang and Min Shi leg.; ZJUH Nos 200603215, 200603216, 200603228, 200603304, 200603307, 200603308, 200603933 • 4 ♀♀; same data as for preceding; ZJUH Nos 200603306, 200603908, 200603313, 200603314. – **Hubei** • 1 ♂; Shennongjia; elev. 1700 m; 26 Aug. 1982; Junhua He leg.; ZJUH No. 824733 • 2 ♀♀; Yingshanxian, Wujiashan National Forest Park; 31°09' N, 115°81' E; elev. 497.07 m; 15–18 Aug. 2022; Kaidong Zhao and Yang Wang leg.; IZCAS IOZ(E) 2059940, 2059941. – **Anhui** • 1 ♀; Jintai, Tiantangtai; 31°17' N, 115°77' E; elev. 548 m; Hongbin Liang leg.; IZCAS IOZ(E) 2059938. – **Hunan** • 1 ♀; Shimen, Huping Mt.; 22 Jun. 1987; Chunguang Lei leg.; ZJUH No. 20044430. – **Guizhou** • 2 ♂♂; Guiyang; 8–12 Oct. 1983; Junhua He leg.; ZJUH Nos 834418a, 834418b • 2 ♀♀; same data as for preceding; ZHUJ Nos 834418c, 834418d • 2 ♀♀; same data as for preceding; 18 Oct. 1983; Junhua He leg.; ZJUH Nos 834721, 834722 • 1 ♂; same data as for preceding; 9 Oct. 1983; Xiufu Zhou leg.; ZJUH No. 20003810 • 2 ♂♂; Xishui, Qiangou; 28 Sep. 2000; Yun Ma leg.; ZJUH Nos 200102600, 200102683 • 1 ♀; Kuangkoushui National Nature Reserve; 3–5 Jun. 2010; Yihan Qian leg.; ZJUH No. 201003582. – **Fujian** • 1 ♀; Wuyi Mt.; 28 Jul. 1984; Juchang Huang leg.; ZJUH No. 20003782 • 1 ♂; same data as for preceding; ZJUH No. 20003781 • 9 ♂♂; same data as for preceding; 6–30 Jul. 1985; Naiquan Lin, Minghui Liu, Geng Zheng, Yuqing Tang and Jiashe Wang leg.; ZJUH Nos 865382, 865447, 865448, 880804, 20003784, 20003785, 20003787, 20003788, 20003790 • 1 ♀; same data as for preceding; 13 Jul. 1985; Xinjin Chen leg.; ZJUH No. 20003777 • 9 ♂♂; same data as for preceding; 20 Jul. 1985; Naiquan Lin leg.; ZJUH Nos 968051, 968053, 968056, 968065, 968068, 968069, 968071, 968090, 968091 • 1 ♂; same data as for preceding; 17 Jul. 1994; Zaifu Xu leg.; ZJUH No. 943032 • 1 ♀; Congan, Tongmu; elev. 790–1155 m; SEMCAS 34025972. – **Sichuan** • 7 ♂♂; Pingwu, Baimazai; 25 Jul. 2006; Hongying Zhang and Zhilei Gao leg.; ZJUH Nos 200610092, 200610917, 200610921, 200610933, 200610942, 200611001, 200611080 • 3 ♀♀; Wanglang Nature Reserve; 26 Jul. 2006; Hongying Zhang leg.; ZJUH Nos 200611088, 200611168, 200611170 • 1 ♀; Wolong; 7–8 Aug. 2013; Zhen Liu leg.; ZJUH No. 201409453. – **Guangdong** • 1 ♀; Nanling; 16–21 Jul. 2008; Zaifu Xu leg.; ZJUH No. 2008077915. – **Xinjiang Uygur Zizhiqu** • 1 ♀; Kashi; 21 Aug. 1979; Fasheng Li leg.; ZJUH No. 200012363. – **Guangxi Zhuangzu Zizhiqu** • 1 ♂; Guilin, Maoer Mt.; 2–10 Aug. 2005; Ping Xiao leg.; ZJUH No. 200610106.

Host

Unknown.

Distribution

China (Anhui, Jilin, Henan, Hainan, Hunan, Hubei, Guizhou, Fujian, Guangdong, Guangxi Zhuangzu Zizhiqu, Xinjiang Uygur Zizhiqu, Sichuan, Zhejiang).

Remarks

Phanerotoma ejuncida van Achterberg, 2021 is a primary homonym of *P. ejuncidus* Chen & Ji, 2003 and, therefore, here renamed as *P. ejuncidoides* van Achterberg, 2024 **nom. nov.**

***Phanerotoma sulcus* Chen & Ji, 2003**

Fig. 30

Phanerotoma sulcus Chen & Ji, 2003: 168–169.

Diagnosis

Pterostigma $4.0\times$ as long as its width (Fig. 30F); third tergite of metasoma rounded posteriorly (Fig. 30H); hypopygium with short spine-like protuberance (Fig. 30I).

Type material

Holotype

CHINA – **Hubei** • ♀; Shengnongjia; 27 Aug. 2000; Jianquan Yang leg.; Fujian Agriculture & Forestry University, Institute of Beneficial Insects, Fuzhou, Fujian, China.

Other material examined

CHINA – **Jilin** • 1 ♀; Changbai Mt.; 4–20 Aug. 1993; Juxian Lou leg.; ZJUH No. 976454.

Host

Unknown.

Distribution

China (Hubei, Jilin).

***Phanerotoma tegularis* sp. nov.**

urn:lsid:zoobank.org:act:17AE575D-92BC-4024-8565-1FDBD1825880

Fig. 31

Diagnosis

Eye large, in lateral view $2.1\times$ as wide as temple (Fig. 31D); vein 2-SR of fore wing strongly bent and subparallel with posterior margin of pterostigma (Fig. 31G); first and second tergites of metasoma coarsely and sparsely rugose (Fig. 31I); hypopygium apically truncate (Fig. 31M); clypeus rather protruding ventrally (Fig. 31E); lower tooth of mandible indistinct and very small (Fig. 31L); third tergite in dorsal view densely rugose and truncate (Fig. 31I); vein 1-M of fore wing brown, darker than yellowish vein M+CU (Fig. 31G); hind tibia with brownish yellow patch subbasally and apically (Fig. 31K).

Etymology

Named after its conspicuous tegulae, from the Latin ‘*tegula*’ for ‘shingle’.

Type material

Holotype

CHINA – **Guangxi Zhuangzu Zizhiqu** • ♀; Longzhou, Nonggang; 20–21 May 1982; Junhua He leg.; ZJUH No. 824397.

Paratypes (4 ♀♀, 3 ♂♂)

CHINA – **Guangxi Zhuangzu Zizhiqu** • 2 ♂♂; same data as for holotype; ZJUH Nos 821671, 822223 • 3 ♀♀; same data as for preceding; ZJUH Nos 824396, 824398, 924396. – **Guizhou** • 1 ♂; Chishui, [on] *Alsophila spinulosa*; 21–22 Sep. 2000; Yun Ma leg.; ZJUH No. 200102957 • 1 ♀; same data as for preceding; ZJUH No. 200103050.

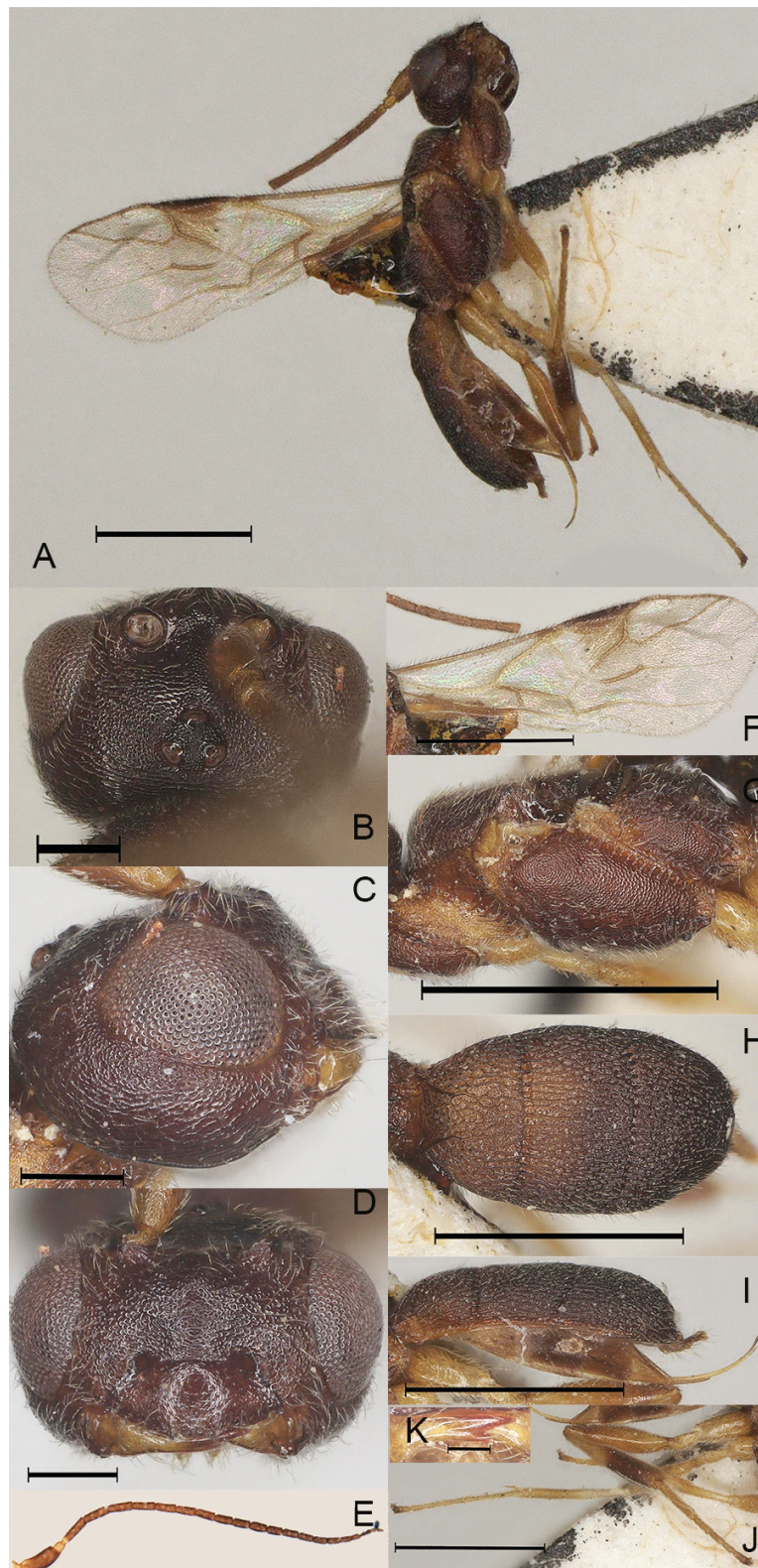


Fig. 30. *Phanerotoma sulcus* Chen & Ji, 2003, China, Hubei, Jilin, ♀ (ZJUH No. 976454). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A, E–J=1 mm; B–D=0.2 mm; K=0.1 mm.

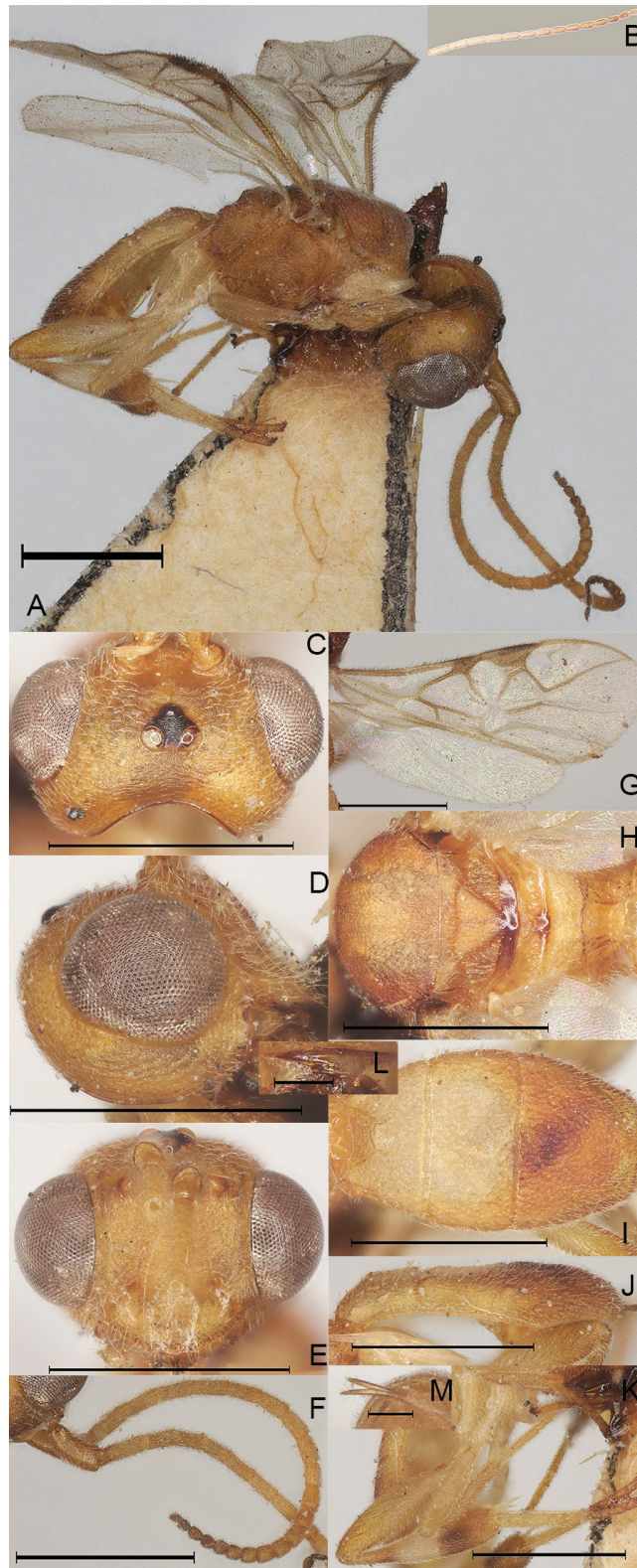


Fig. 31. *Phanerotoma tegularis* sp. nov. **A, C–M.** Holotype, ♀ (ZJUH No. 824397). **B.** Paratype, ♂ (ZJUH No 821671). **A.** Habitus, lateral view. **B.** Apical antenna, lateral view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Antenna, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Hind leg. **L.** Mandible, ventral view. **M.** Hypopygium, ventral view. Scale bars: A–K=1 mm; L–M=0.2 mm.

Description

Female

MEASUREMENTS. Length of body 3.8 mm, of fore wing 3.1 mm.

COLOURATION. Yellow; stemmaticum dark brown; vein M+CU of fore wing, legs (thus hind tibia lacking brown patch), and first and second tergites medially pale-yellow.

HEAD. Width $1.3 \times$ median length in anterior view (Fig. 31E) and part of head above eye in lateral view $0.2 \times$ height of eye (Fig. 31D); antenna with 23 segments, almost as long as fore wing, six subapical segments moniliform (Fig. 31F); area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=25:10:5; eye $1.8 \times$ as long as temple in dorsal view (Fig. 31C); frons punctate-rugose medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face with oblique rugae laterally and transversely rugose medially, without median ridge; clypeus smooth and shiny, $0.9 \times$ minimum width of face, intertentorial distance $3.1 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 small teeth medio-ventrally (Fig. 31E); eye large, in lateral view $2.1 \times$ as wide as temple (Fig. 31D), in anterior view its height $0.9 \times$ minimum width of face; upper condyle of mandible close to lower level of eyes (Fig. 31E); malar space narrow, $0.4 \times$ as long as basal width of mandible; lower tooth of mandible indistinct and very small (Fig. 31L).

MESOSOMA (Fig. 31H). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 31H); scutellum triangular, flat, granulate-rugose and rather shiny; metanotum without median carina and tooth; propodeum coarsely reticulate-rugose, latero-posteriorly tuberculate and no transverse or median carinae.

WINGS. Fore wing $2.5 \times$ as long as its maximum width; 1-R1 $1.4 \times$ as long as pterostigma; r of fore wing $0.3 \times$ as long as 3-SR; distance between 1-R1 and wing apex $0.4 \times$ 1-R1; 2-SR distinctly bent and distally parallel with posterior margin of pterostigma (Fig. 31G); SR1 slightly bent; 2-SR+M present; pterostigma and parastigma large; 1-CU1 $0.4 \times$ as long as vein 2-CU1, cu-a oblique and $0.8 \times$ as long as 1-CU1; r:3-SR:SR1=8:29:82; 2-SR:3-SR:r-m=42:29:14; 2-M straight posteriorly and bent anteriorly (Fig. 31G).

LEGS (Fig. 31K). Hind femur with satin sheen, $3.8 \times$ as long as wide and widened submedially; hind tibia swollen and with brown patch (Fig. 31A); middle tibia with large yellowish blister; hind coxa smooth and shiny.

METASOMA (Fig. 31I–J, M). Carapace elliptical in dorsal view, $1.7 \times$ as long as wide and as long as mesosoma; first and second tergites coarsely rugose; second suture normal; third tergite $1.5 \times$ as long as second tergite and laterally weakly curved, in dorsal view densely rugose and truncate (Fig. 31I), lateral lamella wide, weakly emarginate; ovipositor sheath narrow (Fig. 31J), with some long and erect setae; hypopygium apically truncate and without triangular protuberance (Fig. 31M).

VARIATION. Third tergite in dorsal view truncate to nearly rounded.

Male

Very similar to female, but six subapical segments cylindrical and longer, and hind tibia without brown patch (Fig. 31B).

Host

Unknown.

Distribution

China (Guangxi Zhuangzu Zizhiqu, Guizhou).

Phanerotoma tenebricosa sp. nov.

urn:lsid:zoobank.org:act:DF50D62-5315-4AC9-A6AD-661527BC1974

Fig. 32

Diagnosis

Vein 2-SR of fore wing bent (Fig. 32G); second submarginal cell of fore wing robust (Fig. 32G); mesopleuron largely granulate and rather dull; hypopygium with short robust triangular protuberance (Fig. 32J); clypeus with two minute teeth (Fig. 32E); apical half of hind tibia with dark brown patch (Fig. 32K); vein r of fore wing $0.5 \times$ as long as vein 3-SR; head and mesosoma yellowish brown or dark brown; ocelli small; vein 2-SR of fore wing distinctly bent (holotype) to straight.

Etymology

Named after the mostly dark body of the holotype, from the Latin '*tenebricus*' for 'dark'.

Type material

Holotype

CHINA – **Zhejiang** • ♀; Linan, Qingliangfeng; 8–12 Aug. 2005; Min Shi leg.; ZJUH No. 200603915.

Paratypes (20 ♀♀, 37 ♂♂)

CHINA – **Henan** • 3 ♀♀; Jigong Mt.; 11 Jul. 1997; Xuexin Chen leg.; ZJUH Nos 973872, 975003, 975040 • 10 ♂♂; same data as for preceding; ZJUH Nos 972770, 973718, 973731, 973793, 973818, 973825, 973867, 974906, 975013, 975018. – **Shandong** • 2 ♀♀; Qingdao, Lao Mt.; 4–5 Aug. 1995; Junhua He and Ping Cai leg.; ZJUH Nos 955960, 958440. – **Shanxi** • 1 ♀; Jiangxian; 20 Sep. 1980; Linfu Li leg.; IZCAS IOZ(E)2059946. – **Zhejiang** • 1 ♀; Linan, Qingliangfeng; 9 Aug. 2005; Hongying Zhang leg.; ZJUH No. 200603226 • 1 ♀; same data as for preceding; 11 Aug. 2005; Min Shi leg.; ZJUH No. 200603731 • 2 ♀♀; Tianmu Mt.; 28 Jul. 1999; Mingshui Zhao leg.; ZJUH Nos 998837, 998838 • 1 ♀; same data as for preceding; 21 Jul. 1987; Xiaoming Lou leg.; ZJUH No. 874421. – **Fujian** • 11 ♂♂; Xiamen; 28 Jul. 1988; Junhua He leg.; ZJUH Nos 887723a to 887723k • 6 ♀♀; same data as for preceding; ZJUH Nos 887723l to 887723q • 14 ♂♂; same data as for preceding; 26–27 Jul. 1988; Yun Ma; ZJUH Nos 883821, 883822, 883828 to 883831, 883833a to 883833d, 883834, 883835, 883839, 883841 • 1 ♀; same data as for preceding; ZJUH No. 883840 • 1 ♂; same data as for preceding; 28–29 Jul. 1988; Jinjiang Fan leg.; ZJUH No. 886832 • 1 ♀; Meihua Mt.; elev. 1100–1500 m; 21 Jul. 1988; Junhua He leg.; ZJUH No. 887081. – **Hainan** • 1 ♂; Wuzhi Mt.; 16 May 2007; Jie Zeng leg.; ZJUH No. 200705107 • 1 ♀; same data as for preceding; ZJUH No. 200705102.

Description

Female

MEASUREMENTS. Length of body 3.5 mm, of fore wing 3.1 mm.

COLOURATION. Blackish; mandible (except teeth), scapus, all legs (except hind tibia apically), first tergite largely, second tergite medially, hypopygium, ovipositor sheath, and veins M+CU, 1-M, 3-CU1 and m-cu of fore wing yellow; blister of middle tibia and hind tibia medially ivory.

HEAD. Width $1.3 \times$ median length in anterior view (Fig. 32E) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 32D); antenna with 23 segments, $1.1 \times$ as long as fore wing, five subapical segments nearly moniliform (Fig. 32E); area of stemmaticum mainly granulate; OOL:diameter of

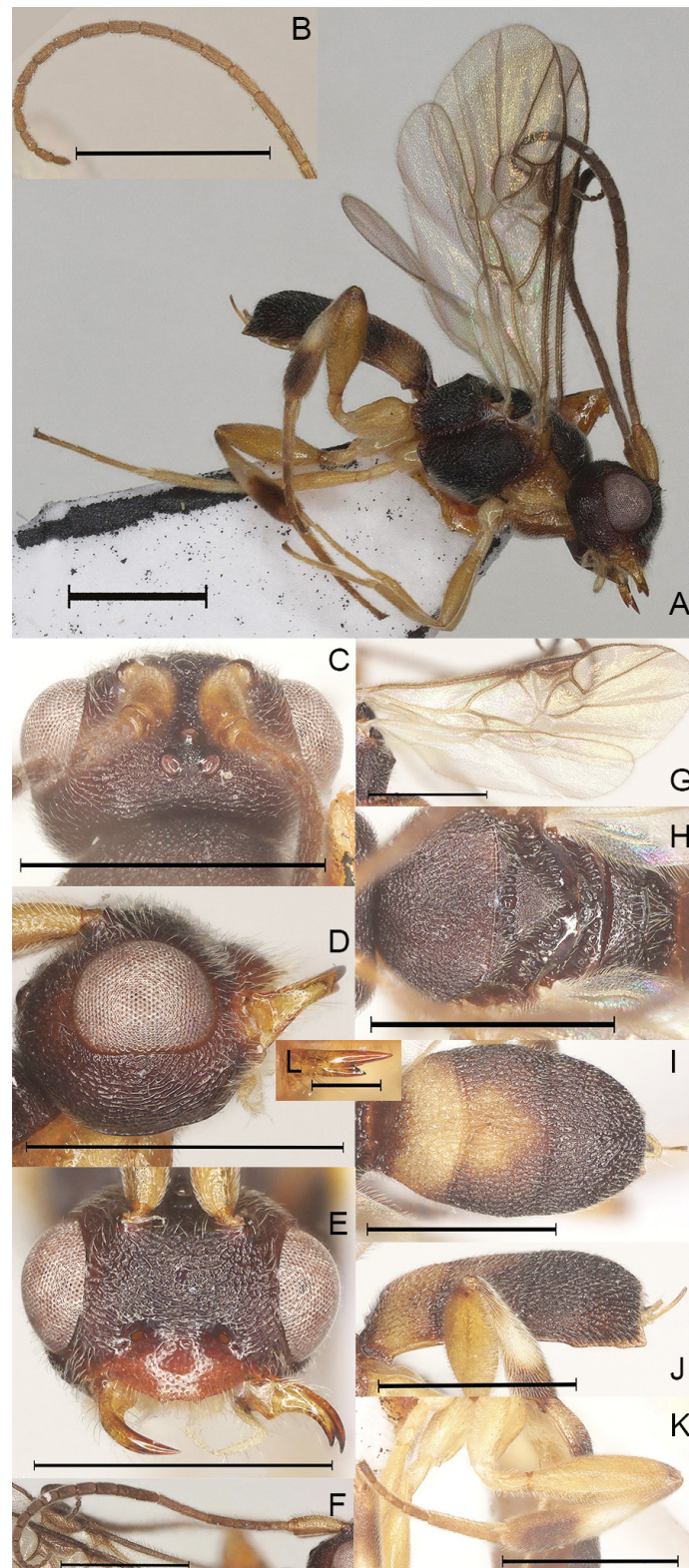


Fig. 32. *Phanerotoma tenebricosa* sp. nov. **A, C–L.** Holotype, ♀ (ZJUH No. 200603915). **B.** Paratype, ♂ (ZJUH No. 972770). **A.** Habitus, lateral view. **B.** Apical antenna, lateral view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Antenna, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Hind leg. **L.** Mandible, ventral view. Scale bars: A–B, F–K=1 mm; C–E=0.2 mm; L=0.1 mm.

posterior ocellus: POL=26:8:8; eye $1.3\times$ as long as temple in dorsal view (Fig. 32C); frons granulate-rugose and without median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face granulate-rugose laterally and transversely rugose medially, without median carina; clypeus transverse, smooth and shiny, $0.9\times$ minimum width of face, intertentorial distance $3.5\times$ minimum width between clypeus and eye, clypeus long erect setose and with 2 teeth medio-ventrally (Fig. 32E); eye medium-sized, in lateral view $1.4\times$ as wide as temple (Fig. 32D), in anterior view its height $0.7\times$ minimum width of face; upper condyle of mandible close to lower level of eyes (Fig. 32E); malar space $0.4\times$ as long as basal width of mandible; lower tooth of mandible $0.3\times$ length of apical tooth, short and robust (Fig. 32L).

MESOSOMA (Fig. 32H). Length $1.3\times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 32H); scutellum triangular, flat, punctate-rugose and rather shiny; metanotum with no median carina anteriorly or tooth posteriorly; propodeum coarsely reticulate-rugose, latero-posteriorly not tuberculate, no transverse or median carinae.

WINGS. Fore wing $3.0\times$ as long as its maximum width; 1-R1 $1.3\times$ as long as pterostigma; r of fore wing $0.5\times$ as long as 3-SR; distance between 1-R1 and wing apex $0.4\times$ 1-R1; 2-SR distinctly bent and distally parallel with posterior margin of pterostigma (Fig. 32G); SR1 straight; 2-SR+M present; pterostigma large, parastigma small; 1-CU1 $0.4\times$ as long as vein 2-CU1, cu-a slightly inclined and $0.8\times$ as long as 1-CU1; r:3-SR:SR1=8:15:80; 2-SR:3-SR:r-m=37:15:12; 2-M bent (Fig. 32G).

LEGS (Fig. 32K). Hind femur with satin sheen, $3.3\times$ as long as wide and widened submedially; hind tibia swollen; middle tibia with medium-sized ivory blister; hind coxa smooth and shiny.

METASOMA (Fig. 32I–J). Carapace elliptical in dorsal view, $1.6\times$ as long as wide and $1.2\times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture wide; third tergite $1.2\times$ as long as second tergite and laterally weakly curved, in lateral view with protruding corner posterior-apically, in dorsal view convex medially, densely and semi-circularly rugose and rounded (Fig. 32I), lateral lamella wide, with some small triangular protuberances latero-apically, emarginate; ovipositor sheath narrow (Fig. 32J), with some long and erect setae; hypopygium apically acute and with up-curved short and robust triangular protuberance (Fig. 32J).

VARIATION. Length of fore wing 2.5–3.1 mm; vein r of fore wing $0.3\text{--}0.5\times$ as long as vein 3-SR; 1-R1 $1.3\text{--}1.5\times$ as long as pterostigma; third tergite $1.1\text{--}1.3\times$ as long as second tergite; length of body 2.5–2.9 mm, body yellowish brown to blackish.

Male

Very similar to female, but five subapical segments cylindrical and longer (Fig. 32B).

Host

Unknown.

Distribution

China (Henan, Shandong, Shanxi, Zhejiang, Fujian, Hainan).

Phanerotoma thoracica sp. nov.

urn:lsid:zoobank.org:act:54A1C4B8-8EE1-4833-9525-9C9A1B59D0D5

Fig. 33

Diagnosis

Vein 2-SR of fore wing anteriorly diverging from posterior side of pterostigma, gap comparatively wide and distinctly narrowed anteriorly (Fig. 33F); vein 1-CU1 of fore wing $0.4\times$ as long as vein 2-CU1; face largely granulate-rugose and transversely rugose medio-posteriorly, with median bump (Fig. 33D); lower tooth of mandible minute (Fig. 33K).

Differential diagnosis

Very similar to *P. bilinea* Lyle, 1924, but this species has the lower tooth of the mandible medium-sized (van Achterberg 1990: fig. 269).

Etymology

Named after the yellow mesosoma, from the Latin ‘*thorax*’ for ‘breast’.

Type material

Holotype

CHINA – **Zhejiang** • ♀; Tianmu Mt.; 20 Jul. 1998; Mingshui Zhao leg.; ZJUH No. 20000912.

Paratypes (28 ♀♀)

CHINA – **Zhejiang** • 1 ♀; same data as for holotype; 1 Aug. 1998; Mingshui Zhao leg.; ZJUH No. 20002959 • 1 ♀; same data as for preceding; 14 Nov. 1998; Mingshui Zhao leg.; ZJUH No. 20003133 • 5 ♀♀; Anji, Longwang Mt.; 20 Sep. 2004; Xuexin Chen leg.; ZJUH Nos 20050002, 20050006, 20050010, 20050012, 20050023 • 2 ♀♀; same data as for preceding; Belokobylskij leg.; ZJUH Nos 20050021, 20050030 • 1 ♀; Linan, Qingliangfeng; 7 Aug. 2005; Hongying Zhang leg.; ZJUH No. 200603195 • 2 ♀♀; Taishun, Wuyanling; 31 Jul. 2005; Shujun Wei leg.; ZJUH Nos 200605151, 200605153 • 1 ♀; Anji, Longwang Mt.; 20 Sep. 2004; ZJUH No. 20050016. – **Xizang Zizhiqu** • 1 ♀; Linzhi, Bomigang Village; 8 Aug. 2019; Pu Tang leg.; ZJUH No. 202300029. – **Guizhou** • 2 ♀♀; Du Mt.; 6 May 1980; Shengzhen Zhou leg.; ZJUH Nos 860586, 860176 • 1 ♀; Chishui, Gangou; 29 May 2000; Yun Ma leg.; ZJUH No. 200102959 • 1 ♀; same data as for preceding; [on] *Alsophila spinulosa*; 21 Sep. 2000; Yun Ma leg.; ZJUH No. 200103256. – **Shaanxi** • 1 ♀; Luonan, Shangluo; 34°82' N, 110°19' E, elev. 1006 m; 9 Jul.–9 Sep. 2017; Jiangli Tan and Qingqing Tan leg.; ZJUH. – **Henan** • 1 ♀; Jigong Mt.; 11 Jul. 1997; Xuexin Chen leg.; ZJUH No. 973710 • 1 ♀; Jigong Mt.; 11 Jul. 1997; Xuexin Chen leg.; ZJUH No. 973934 • 2 ♀♀; Fangxian; 23 Aug. 1982; Junhua He leg.; ZJUH Nos 82322, 826976 • 1 ♀; Zhu Mt.; 28 Aug. 1982; Junhua He leg.; ZJUH No. 824807. – **Hebei** • 1 ♀; Wudang Mt.; 17 Jul. 1997; Yuzhou Du leg.; ZJUH No. 975107. – **Fujian** • 3 ♀♀; Jiangle, Longxi Mt.; 8 Jul. 1991; Changming Liu leg.; ZJUH Nos 969015, 969017, 20006524.

Description

Female

MEASUREMENTS. Length of body 3.0 mm, of fore wing 2.7 mm.

COLOURATION. Yellow; stemmaticum dark brown; third tergite brown; hind tibia laterally brown and ventrally brownish.

HEAD. Width $1.6\times$ median length in anterior view (Fig. 33D) and part of head above eye in lateral view $0.2\times$ height of eye (Fig. 33C); antenna with 23 segments, $1.2\times$ as long as fore wing, five subapical

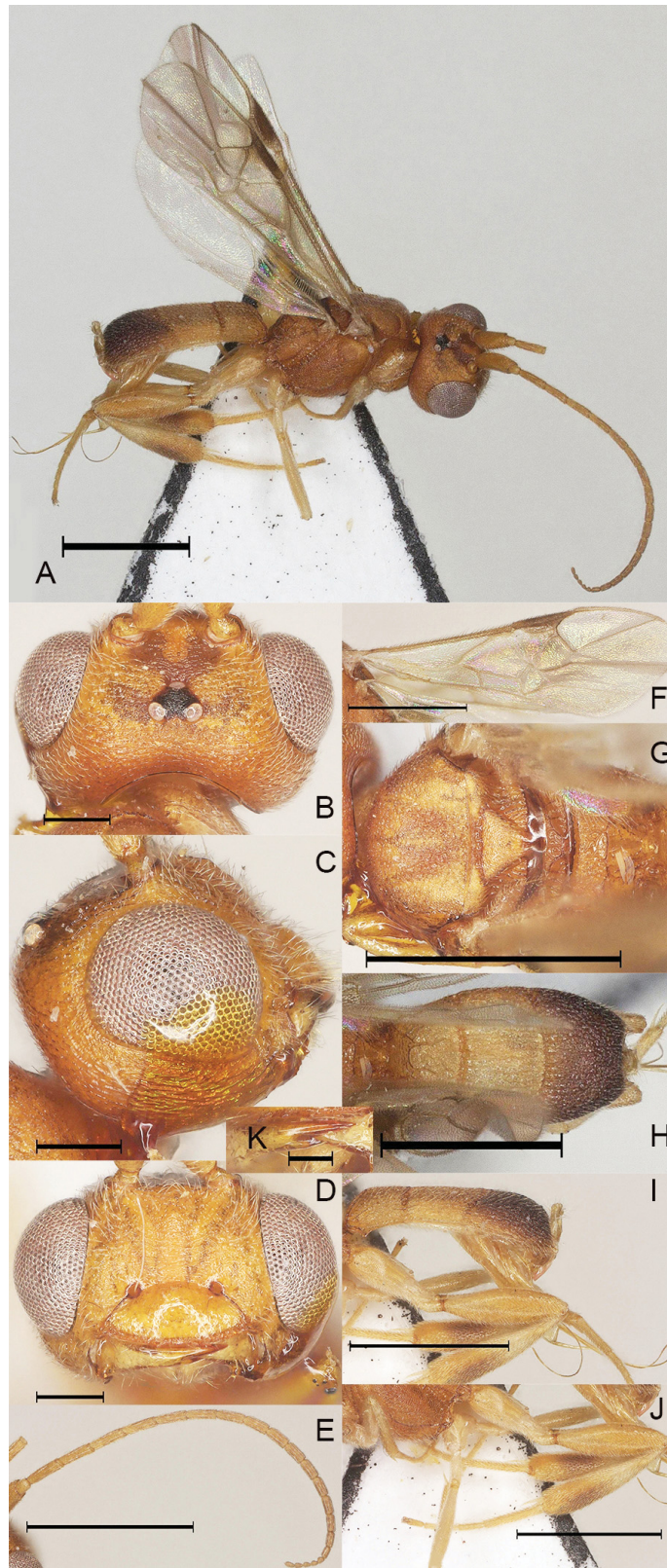


Fig. 33. *Phanerotoma thoracica* sp. nov., holotype, ♀ (ZJUH No. 20000912). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

segments moniliform (Fig. 33E); area of stemmaticum mainly granulate; OOL: diameter of posterior ocellus:POL=21:6:7; eye $1.5\times$ as long as temple in dorsal view (Fig. 33B); frons punctate-rugose medially, rugose laterally and with weak median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face largely granulate-rugose and transversely rugose medio-ventrally, with median bump dorsally; clypeus smooth and shiny, $0.9\times$ minimum width of face, intertentorial distance $2.4\times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 indistinct teeth medio-ventrally (Fig. 33D); eye large, in lateral view $1.9\times$ as wide as temple (Fig. 33C), in anterior view its height $0.8\times$ minimum width of face; upper condyle of mandible close to lower level of eyes (Fig. 33E); malar space short, $0.6\times$ as long as basal width of mandible; lower tooth of mandible $0.3\times$ length of apical tooth, short and minute (Fig. 33K).

MESOSOMA (Fig. 33G). Length $1.5\times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 33G); scutellum triangular, flat, granulate-rugose and rather shiny; metanotum with short median carina anteriorly and small protruding tooth posteriorly; propodeum coarsely reticulate-rugose, no lateral tubercles or transverse and median carinae.

WINGS. Fore wing $3.0\times$ as long as its maximum width; 1-R1 $1.4\times$ as long as pterostigma; r of fore wing $0.3\times$ as long as 3-SR; distance between 1-R1 and wing apex $0.4\times$ 1-R1; 2-SR curved (Fig. 33F); SR1 straight; 2-SR+M present; pterostigma large, parastigma small; 1-CU1 $0.4\times$ as long as vein 2-CU1, cu-a oblique and as long as 1-CU1; r:3-SR:SR1=6:20:76; 2-SR:3-SR:r-m=33:20:11; 2-M bent (Fig. 33F).

LEGS (Fig. 33J). Hind femur with satin sheen, $3.4\times$ as long as wide and widened submedially; hind tibia rather swollen; middle tibia with medium-sized pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 33H–I). Carapace elliptical in dorsal view, $1.7\times$ as long as wide and $1.1\times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite as long as second tergite and laterally weakly curved, in dorsal view densely rugose and truncate (Fig. 33H), lateral lamella wide, with shallow emargination; ovipositor sheath narrow and long (Fig. 33I), with some long erect setae; hypopygium protruding apically in ventral view, spine-like in lateral view (Fig. 33I).

VARIATION. Length of fore wing 2.5–3.0 mm; eye 1.3 – $1.7\times$ as long as temple in dorsal view; 1-R1 1.3 – $1.5\times$ as long as pterostigma; hind femur 3.3 – $3.8\times$ as long as wide; metasomal carapace 1.6 – $1.8\times$ as long as wide.

Male

Unknown.

Host

Unknown.

Distribution

China (Xizang Zizhiqu, Zhejiang, Henan, Guizhou, Shaanxi, Hubei, Fujian).

***Phanerotoma tridentati* Ji & Chen, 2003**

Fig. 34

Phanerotoma tridentati Ji & Chen in Chen & Ji, 2003: 176.

Diagnosis

Apical triangular protuberance of hypopygium of female short and robust (Fig. 34F); side of third tergite curved (Fig. 34I); vein 3-SR of fore wing about 4× as long as vein r (Fig. 34G); penultimate antennal segments of female about 4× as long as wide (Fig. 34K); clypeus with three slender and minute teeth (Fig. 34E); vein 2-SR of fore wing more or less curved or bent.

Type material

Holotype

CHINA – **Jilin** • ♀; Changbai Mt.; 6 Aug. 1989; Xiaohua Zhou leg.

Other material examined (39 ♀♀, 36 ♂♂)

CHINA – **Shaanxi** • 1 ♂; 25 Jun. 1976; Xinde Dang leg.; ZJUH No. 815973a • 2 ♀♀; same data as for preceding; ZJUH No. 815973b, 815973c • 2 ♂♂; Tongchuan; 29 Jun. 1983; Xinde Dang leg.; ZJUH Nos 831901a, 831901b • 1 ♀; same data as for preceding; ZJUH No. 831901c. – **Liaoning** • 1 ♂; Benxi; Aug. 1963; Zhenlu Liu leg.; ZJUH No. 63056.1 • 1 ♀; same data as for preceding; ZJUH No. 63056.9. – **Anhui** • 1 ♀; Dongzhi; 14 Sep. 1989; Guangji Cha leg.; ZJUH No. 896530. – **Zhejiang** • 1 ♀; Tianmu Mt.; 3 Jul. 1998; Mingshui Zhao leg.; ZJUH No. 20000135 • 1 ♂; Chunan, Lao Mt.; 5 Aug. 1987; Jinnian Zhao leg.; ZJUH No. 200800259 • 3 ♀♀; same data as for preceding; ZJUH Nos 200800258, 200800260, 200800261 • 1 ♀; Songyang; 10 May 1986; Hanlin Chen leg.; No. 870493 • 1 ♀; Qingyuan; Baishanzu; 20 Jul. 1993; Hong Wu leg.; ZJUH No. 905134 • 1 ♀; Songyang; 1-6 Aug. 1989; Junhua He leg.; ZJUH No. 895427 • 2 ♀♀; Linan, Qingliangfeng; 10 Aug. 2005; Hongying Zhang leg.; ZJUH Nos 200603342, 200603358 • 13 ♂♂; Tianmu Mt.; 21–23 Jul. 1993; Mingshui Zhao leg.; ZJUH Nos 991921, 991927, 991939, 991950, 991959, 993231, 994239, 994643, 994653, 998007, 998034, 998036, 200010855 • 2 ♀♀; same data as for preceding; ZJUH Nos 994906, 994904 • 2 ♂♂; same data as for preceding; 3–14 Jul. 1998; Mingshui Zhao leg.; ZJUH Nos 20000135, 20000186 • 3 ♀♀; same data as for preceding; ZJUH Nos 20000150, 20000199, 20000362 • 1 ♀; same data as for preceding; 18 Jun. 1983; Junhua He leg.; ZJUH No. 830695 • 1 ♂; Anji, Longwang Mt.; 20 Sep. 2004; Xuexin Chen and Belokobylskij leg.; ZJUH No. 20050022 • 2 ♀♀; same data as for preceding; ZJUH Nos 20049994, 20049995 • 1 ♀; Linan, Qingliangfeng; 4 Jul. 2008; Junhua He leg.; ZJUH • 1 ♂; Longquan, Fengyang Mt.; 14 Aug. 2003; Jingxian Liu leg.; ZJUH No. 20045226 • 1 ♀; Taishun, Wuyanling; 28 Jul. 2005; Shujun Wei leg.; ZJUH No. 200604988 • 7 ♂♂; same data as for preceding; 28 Jul.–2 Aug. 2005; Shujun Wei leg.; ZJUH Nos 20064987, 200505155, 200605206, 200605207, 20065211, 200605154, 20065215 • 7 ♀♀; same data as for preceding; ZJUH Nos 200605210, 200605156, 200605205, 200505158, 200604986, 200604988, 200505157 • 1 ♀; same data as for preceding; Jingxian Liu leg.; ZJUH No. 200609748. – **Hubei** • 2 ♀♀; Fangxian; 29 Aug. 1982; Junhua He leg.; ZJUH Nos 825323, 825324 • 1 ♂; Xunxian; 28 Aug. 1982; Junhua He leg.; ZJUH No. 824831 • 2 ♂♂; Zhu Mt.; 28 Aug. 1982; Junhua He leg.; ZJUH Nos 824802, 824806. – **Hebei** • 3 ♀♀; Handan; 4 Sep. 1977; Zhongshi Ma leg.; ZJUH Nos 780117, 790604, 800856. – **Jilin** • 1 ♀; Dongliao; 22–31 Jul. 1988; Xiaoming Lou leg.; ZJUH No. 888127 • 2 ♂♂; same data as for preceding; ZJUH Nos 888122, 888204. – **Guangxi Zhuangzu Zizhiqu** • 1 ♀; Longzhou, Nonggang; elev. 550 m; 13 Jun. 2006; Jian Yao leg.; ZJUH No. 200105115 • 2 ♀♀; Jiuwanda Mt.; elev. 1100–1600 m; 27 Aug. 2001; Guofang Jiang leg.; ZJUH Nos 20021384, 20021395. – **Guizhou** • 1 ♂; Fanjing Mt.; 2 Aug. 2001; elev. 1300 m; Yun Ma leg.; ZJUH No. 200108479. – **Henan** • 1 ♂; Jigong Mt.; 12 Jul. 1997; Xuexin Chen leg.; ZJUH No. 975002.

Hosts

Dioryctria rubella Hampson, 1901 (Pyralidae), *D. mendacella* (Staudinger, 1859) (Pyralidae) and *Gravata margartana* (Heinemann, 1863) (Tortricidae).

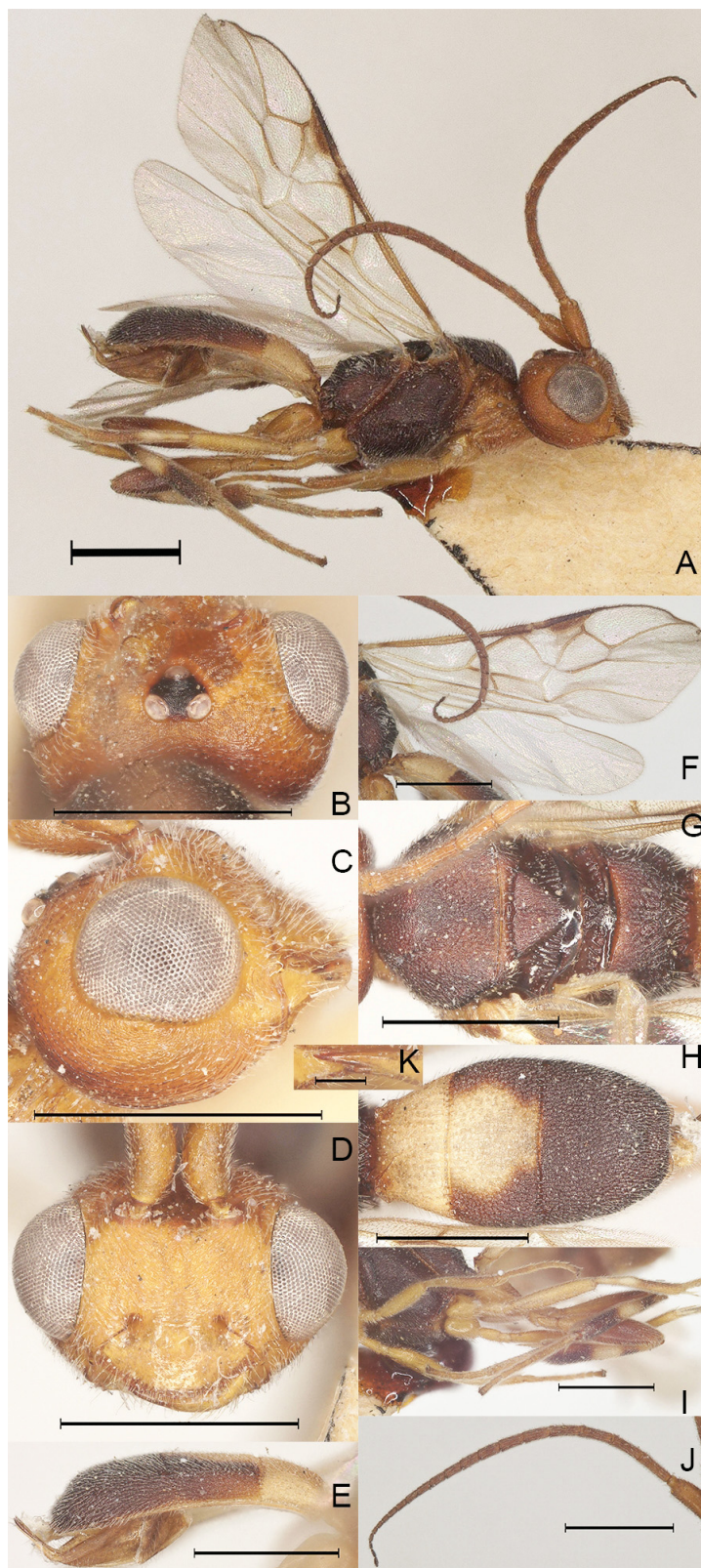


Fig. 34. *Phanerotoma tridentati* Ji & Chen, 2003, China, Zhejiang, ♀ (ZJUH No. 870493). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Metasoma, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Hind leg. **J.** Antenna, lateral view. **K.** Mandible, ventral view. Scale bars: A–J = 1 mm; K = 0.2 mm.

Distribution

China (Jilin, Shaanxi, Guangxi Zhuangzu Zizhiqu, Guangdong, Hebei, Zhejiang, Guizhou, Henan, Anhui, Liaoning, Hubei).

Phanerotoma tritoma (Marshall, 1898)

Fig. 35

Chelonus (Ascogaster) tritonus Marshall, 1898: 170.

Phanerotoma antennalis Snoflák, 1951: 20.

Bracotritoma tritonus – Shenefelt 1973: 909.

Phanerotoma antennalis – Shenefelt 1973: 910. — Zettel 1987: 363.

Phanerotoma dentata auct. p.p.; Shenefelt 1973: 912.

Diagnosis

Body mostly black or blackish; metasomal carapace slender and $2.2\times$ as long as wide in dorsal view (Fig. 35G); third tergite distinctly convex posteriorly (Fig. 35G); POL almost equal to diameter of posterior ocellus (Fig. 35B); middle tibia slender, with indistinct blister (Fig. 35I); vein r of fore wing as wide as vein 3-SR (Fig. 35E); first discal cell of fore wing moderately to widely truncate anteriorly; lateral sides of third metasomal tergite nearly straight; vein cu-a of fore wing subvertical.

Type material

Holotype of *Phanerotoma tritoma*

UK – England • ♂; Surrey, Oxshott; 4 Jun. 1891; Marshall leg.

Other material examined

CHINA – Xizang Zizhiqu • 1 ♀; Linzhi, Bomigang village; 9 Aug. 2019; Chunhong Wang leg.; ZJUH No. 202300023 • 1 ♀; same data as for preceding; Xiaofeng Li leg.; ZJUH No. 202300013. – Zhejiang • 1 ♀; Anji, Longwang Mt.; 12 Jul. 1996; Hong Wu leg.; ZJUH No. 971532.

Hosts

Coleophora lutipennella (Zeller, 1838) (Coleophoridae); *Cydia delineana* (Walker, 1863) (Tortricidae); *Grapholita funebrana* (Treitschke, 1835) (Tortricidae); *Gelechia senticetella* (Staudinger, 1859) (Gelechiidae); *Pammene regiana* (Zeller, 1849) (Tortricidae).

Distribution

Austria, Bulgaria, China (Xizang Zizhiqu, Zhejiang), Cyprus, Czech Republic, France, Greece, Hungary, Ireland, Italy, Korea, the Netherlands, Poland, Romania, Russia, Spain, Switzerland, United Kingdom. China is a new record.

Phanerotoma truncata sp. nov.

urn:lsid:zoobank.org:act:E276C3ED-AE15-4DFF-9EB4-0F0BBAA6058D

Fig. 36

Diagnosis

Seven subapical segments of female antenna moniliform (Fig. 36A, E); head comparatively emarginate posteriorly in dorsal view; face without median ridge (Fig. 36D); vein 3-SR of fore wing infusate

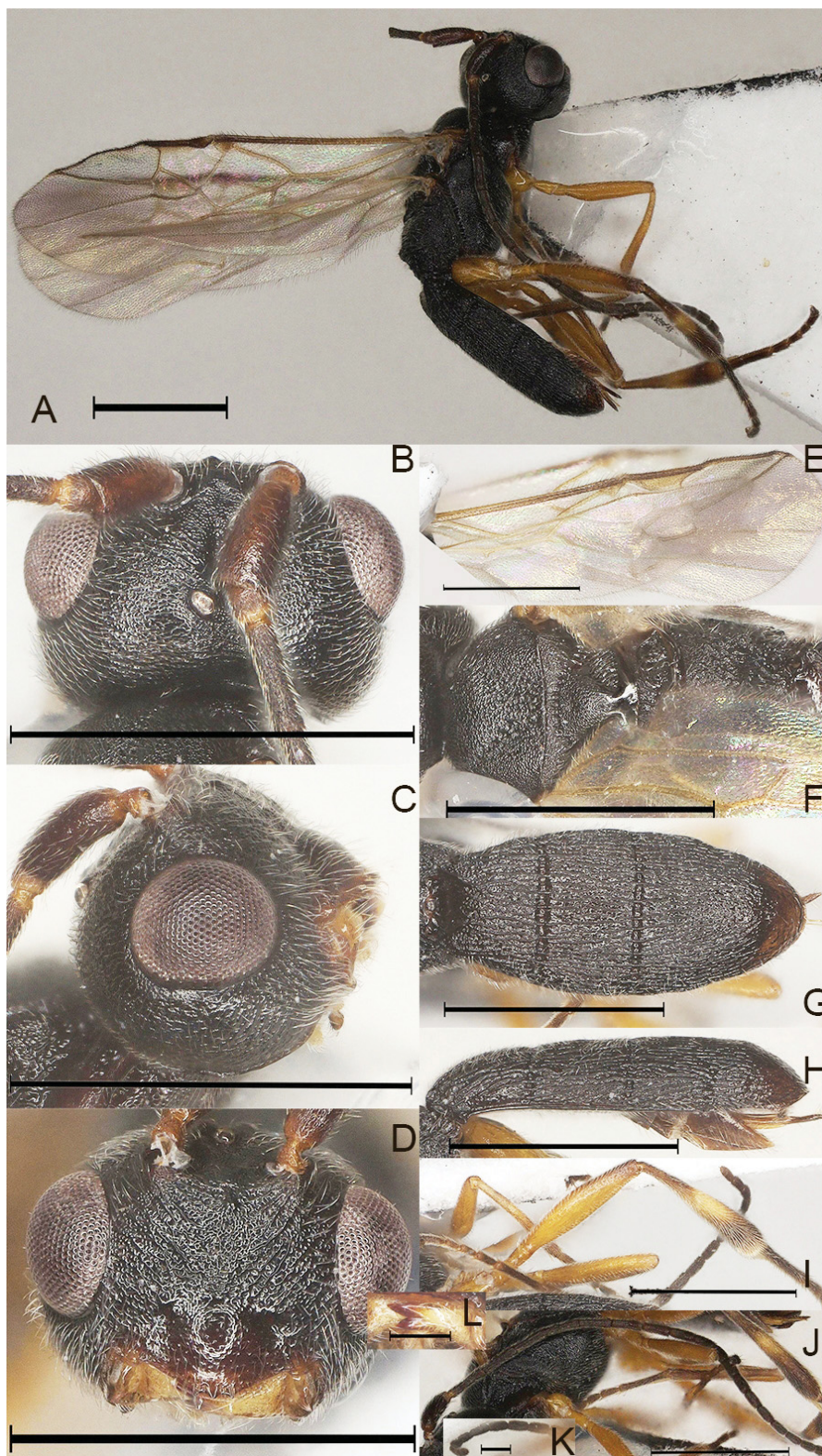


Fig. 35. *Phanerotoma tritoma* (Marshall, 1898), China, Xizang Zizhiqu, ♀ (ZJUH No. 202300023). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Fore wing. **F.** Mesosoma, dorsal view. **G.** First third of metasomal tergites, dorsal view. **H.** Metasoma, lateral view. **I.** Hind leg. **J.** Antenna, lateral view. **K.** Apical antenna, lateral view. **L.** Mandible, ventral view. Scale bars: A–J = 1 mm; K–L = 0.2 mm.

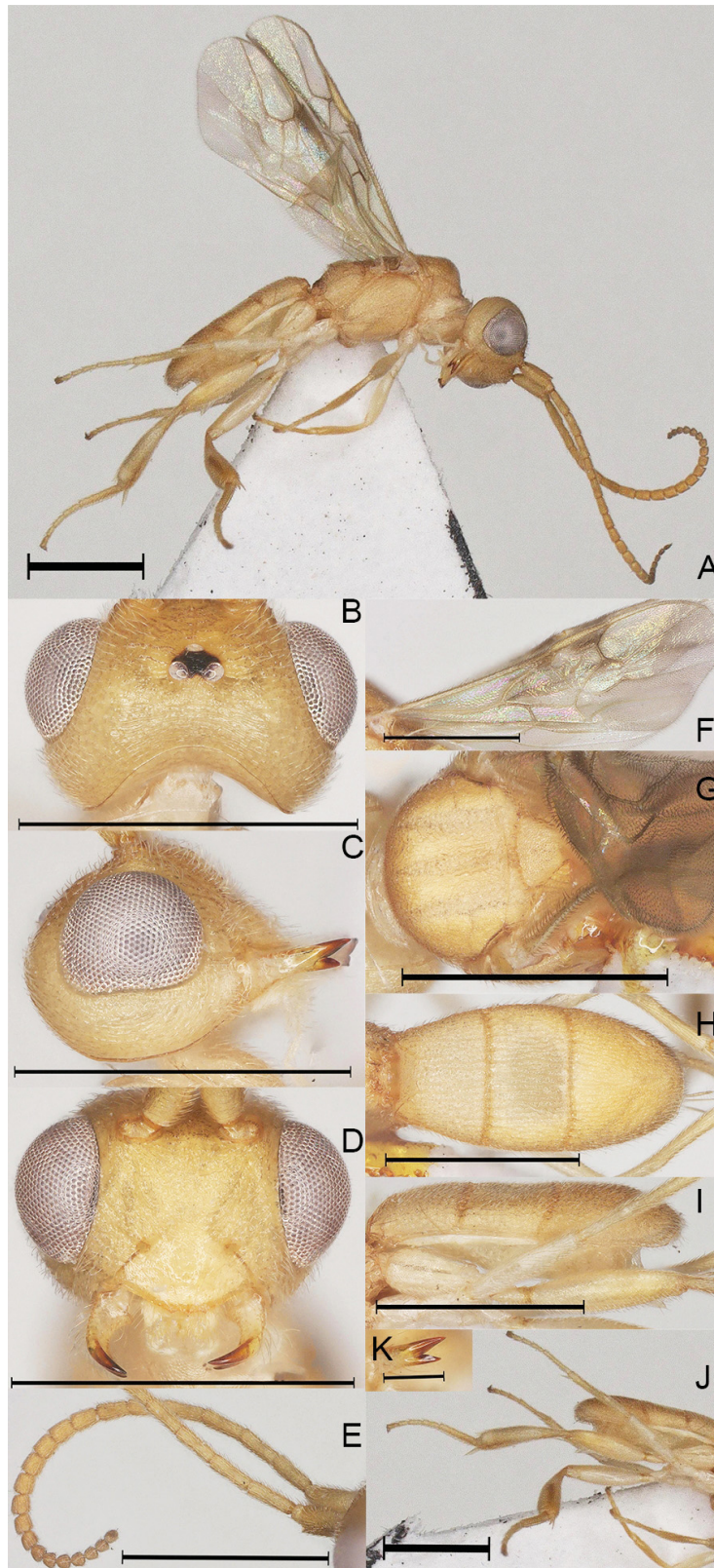


Fig. 36. *Phanerotoma truncata* sp. nov., holotype, ♀ (ZJUH No. 201105501). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

(Fig. 36F); posterior lamella of third metasomal tergite narrow medially (Fig. 36I); head behind stemmaticum convex; eyes moderately protruding in dorsal view (Fig. 36B).

Etymology

Named after the broadly truncate third tergite, from the Latin '*truncus*' for 'cut off'.

Type material

Holotype

CHINA – Taiwan • ♀; Duonalindao; 3 Jun. 2011; Pu Tang leg.; ZJUH No. 201105501.

Paratype

CHINA – Taiwan • 1 ♀; Shouka; 30 May 2011; Pu Tang leg.; ZJUH No. 201105418.

Description

Female

MEASUREMENTS. Length of body 3.4 mm, of fore wing 2.7 mm.

COLOURATION. Yellow; stemmaticum and side of scutellum dark brown; teeth of mandible brown; pterostigma, parastigma, and veins r and 3-SR of fore wing infusate; apical half of hind tibia with yellowish brown patch laterally.

HEAD. Width $1.4 \times$ median length in anterior view (Fig. 36D) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 36C); antenna with 23 segments, almost as long as fore wing, seven subapical antennal segments moniliform (Fig. 36E); area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=20:7:5; eye $1.7 \times$ temple in dorsal view (Fig. 36B); frons with longitudinal rugae medially, rugose laterally and with median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face with oblique rugae and with short median ridge; clypeus smooth, shiny and $0.8 \times$ minimum width of face, intertentorial distance $1.9 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 minute teeth medio-ventrally (Fig. 36D); eye large and in lateral view $1.7 \times$ as wide as temple (Fig. 36C), in anterior view its height $0.5 \times$ minimum width of face; upper condyle of mandible close to lower level of eyes (Fig. 36D); malar space $0.8 \times$ as long as basal width of mandible; lower tooth of mandible $0.7 \times$ length of apical tooth, robust and large (Fig. 36K).

MESOSOMA (Fig. 36G). Length $1.8 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 36G); scutellum triangular, flat, distinctly punctate-rugose and rather shiny; metanotum with short median carina anteriorly and small tooth protruding posteriorly; propodeum coarsely reticulate-rugose, no lateral tubercles or transverse and median carinae.

WINGS. Fore wing $3.0 \times$ as long as its maximum width; length of 1-R1 $1.5 \times$ as long as pterostigma; r $0.8 \times$ 3-SR; distance between 1-R1 and wing apex $0.3 \times$ 1-R1; 2-SR nearly straight (Fig. 36F); SR1 slightly bent; 2-SR+M present; pterostigma large, parastigma medium-sized; 1-CU1 $0.6 \times$ as long as vein 2-CU1, cu-a oblique and $0.6 \times$ as long as 1-CU1; r:3-SR:SR1=11:15:71; 2-SR:3-SR:r-m=28:15:11; 2-M bent (Fig. 36F).

LEGS (Fig. 36J). Hind femur moderately slender and with satin sheen, $3.7 \times$ as long as wide and rather widened submedially; hind tibia swollen; middle tibia with medium-sized ivory blister; hind coxa smooth and shiny.

METASOMA (Fig. 36H–I). Carapace elliptical in dorsal view, $2.0\times$ as long as wide and $1.1\times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture narrow; third tergite $1.3\times$ as long as second tergite and laterally weakly curved, in lateral view slightly convex posteriorly, in dorsal view densely and semi-circularly rugose and truncate (Fig. 36H), lamella wide and medio-apically weakly emarginate; ovipositor sheath short and slender (Fig. 36I), with some long and erect setae; hypopygium apically acute, without triangular protuberance (Fig. 36I).

Male

Unknown.

Host

Unknown.

Distribution

China (Taiwan).

Phanerotoma zebripes Chen & Ji, 2003

Fig. 37

Phanerotoma zebripes Chen & Ji, 2003: 178.

Diagnosis

Clypeus with three teeth, but middle tooth indistinct (Fig. 37D); third tergite of metasoma $1.3\times$ as long as second tergite (Fig. 37H); temple wide, eye $1.1\times$ as wide as temple in lateral view (Fig. 37C); vein r of fore wing $0.8\times$ as long as vein 3-SR (Fig. 37F); hypopygium with long spine-like protuberance (Fig. 37I).

Type material

Holotype

CHINA – **Fujian** • ♀; Wuyi - Huanggang Mt.; 22 Jul. 1986; Chengliang Shangguan leg.; Fujian Agriculture and Forestry University, Institute of Beneficial Insects, Fuzhou, Fujian, China.

Other material examined (18 ♀♀, 6 ♂♂)

CHINA – **Shaanxi** • 1 ♀; Huanghualing; 33°80' N, 108°88' E; elev. 1408 m; 20 May.–1 Jun. 2016; Jiangli Tan and Qingqing Tan leg.; ZJUH. – **Zhejiang** • 1 ♀; Longquan, Fengyang Mt.; 30 Jul. 2007; Jingxian Liu leg.; ZJUH No. 200802892. – **Ningxia Huizu Zizhiqu** • 1 ♀; Liupan Mt.; 14 Aug. 2008; Zhijie Wang leg.; ZJUH No. 200804757. – **Hebei** • 2 ♀; Zhajiangkou, Xiaowutai Mt.; 20–23 Aug. 2005; ZJUH Nos 202300101, 202300107 • 1 ♂; same data as for preceding; Jingxian Liu leg.; ZJUH No. 200610151 • 11 ♀♀; same data as for preceding; Jingxian Liu leg.; ZJUH Nos 200610134, 200610136 to 200610138, 200610143, 200610145, 200610146, 200610148, 200610154, 200610155, 200610157 • 1 ♀; same data as for preceding; Min Shi leg.; ZJUH No. 200604654. – **Sichuan** • 2 ♂♂; Pingwu, Baimazhai; 25 Jul. 2006; Hongying Zhang and Zhilei Gao leg.; ZJUH Nos 200610901, 200611022 • 2 ♀♀; same data as for preceding; ZJUH Nos 200611089, 200611101 • 1 ♂; Wanglang National Nature Reserve; elev. 2500 m; 26 Jul. 2006; Yiping Wang leg.; ZJUH No. 200800264 • 2 ♂♂; same data as for preceding; Hongying Zhang leg.; ZJUH Nos 200611190, 200611202.

Host

Unknown.

Distribution

China (Fujian, Shaanxi, Zhejiang, Ningxia Huizu Zizhiqu, Hebei, Sichuan).

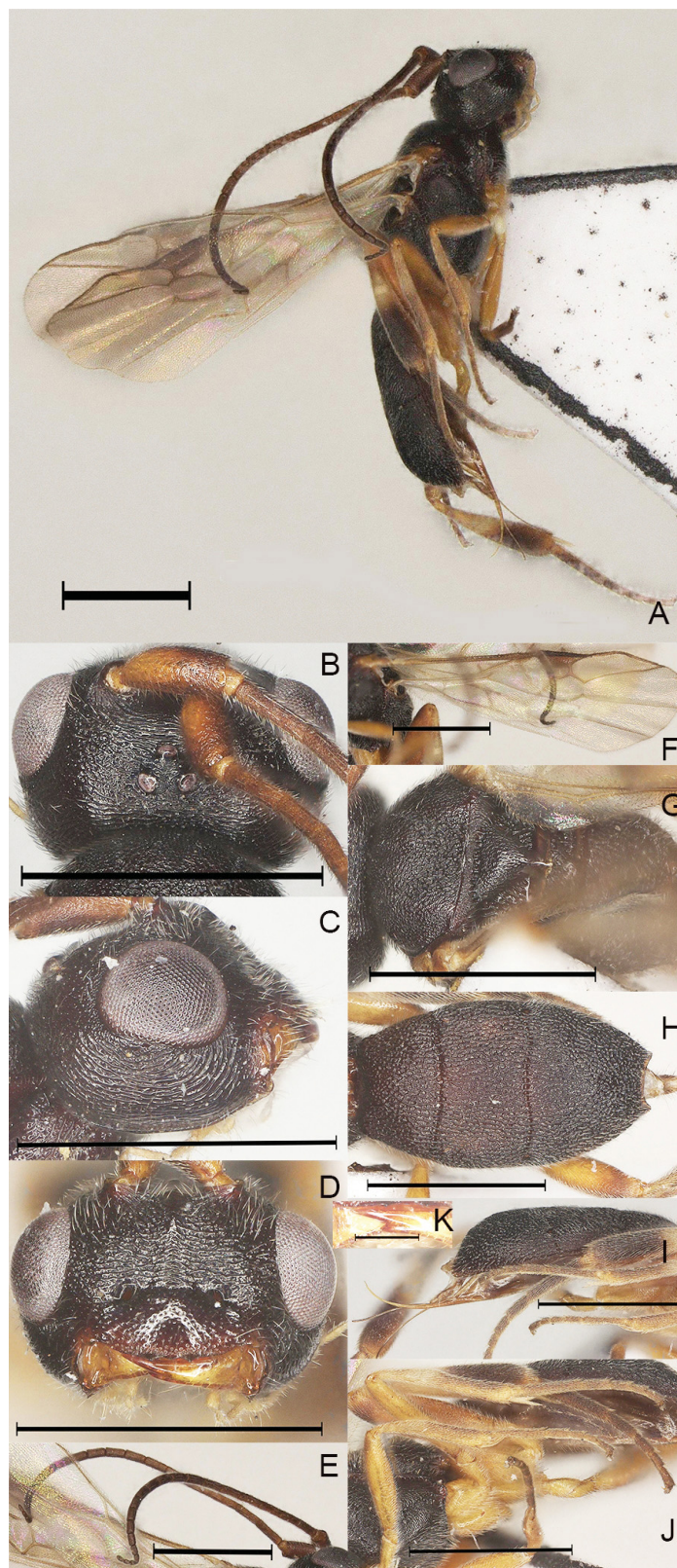


Fig. 37. *Phanerotoma zebripes* Chen & Ji, 2003, China, Hebei, ♀ (ZJUH No. 200610143). **A.** Habitus, lateral view. **B.** Head, dorsal view. **C.** Head, lateral view. **D.** Head, anterior view. **E.** Antenna, lateral view. **F.** Fore wing. **G.** Mesosoma, dorsal view. **H.** First third of metasomal tergites, dorsal view. **I.** Metasoma, lateral view. **J.** Hind leg. **K.** Mandible, ventral view. Scale bars: A–J=1 mm; K=0.2 mm.

Phanerotoma zhaoui sp. nov.

urn:lsid:zoobank.org:act:FAF7831C-1427-4E23-9E7C-E8859B434BD8

Fig. 38

Diagnosis

Vein 2-SR of fore wing strongly bent and subparallel with posterior margin of pterostigma (Fig. 38G); five subapical segments of female antenna moniliform (Fig. 38F); second submarginal cell of fore wing rather wide distally (Fig. 38G); penultimate antennal segment narrow basally and widened apically; scapus yellowish brown.

Etymology

Named after the collector of the holotype, Ming-Shui Zhao.

Type material

Holotype

CHINA – **Zhejiang** • ♀; Tianmu Mt.; 1 Jun. 1999; Mingshui Zhao leg.; ZJUH No. 200003241.

Paratypes (23 ♀♀, 4 ♂♂)

CHINA – **Zhejiang** • 1 ♂; same data as for holotype; 14 Sep. 1989; Mingshui Zhao leg.; ZJUH No. 995193 • 1 ♀; same data as for preceding; ZJUH No. 995194 • 1 ♀; same data as for preceding; 16 Mar. 1999; Mingshui Zhao leg.; ZJUH No. 20003168 • 1 ♀; same data as for preceding; 26 Sep. 1998; Mingshui Zhao leg.; ZJUH No. 20003022 • 1 ♂; same data as for preceding; 21 Jul. 1987; ZJUH No. 873048 • 1 ♀; same data as for preceding; 1 Jun. 1999; Mingshui Zhao leg.; ZJUH No. 20003273 • 1 ♂; Anji, Longwang Mt.; 31 Aug. 1993; Junhua He leg.; ZJUH No. 9310123 • 1 ♂; same data as for preceding; ZJUH No. 9310788 • 1 ♀; same data as for preceding; 18 Sep. 1995; Hong Wu leg.; ZJUH No. 970276. – **Yunnan** • 1 ♀; Damenglong; 17 Apr. 1981; Junhua He leg.; ZJUH No. 811747. – **Xizang Zizhiqu** • 1 ♀; Linzhi, Xiachayu; 15 Aug. 2019; Chunhong Wang leg.; ZJUH No. 202300109. – **Anhui** • 1 ♀; Yuexi; 11 Sep. 1981; Fuan Yang leg.; ZJUH No. 820574. – **Hubei** • 1 ♀; Shennongjia; elev. 880 m; 23 Aug. 1982; Junhua He leg.; ZJUH No. 825353 • 3 ♀♀; Zhu Mt.; 28 Aug. 1982; Junhua He leg.; ZJUH Nos 824804a to 824804c • 1 ♀; Laifeng; Sep. 1978; Guanpei Min leg.; ZJUH No. 870403. – **Guizhou** • 2 ♀♀; Sandu; 23 Oct. 1986; Dongxiang Liu leg.; ZJUH No. 871980a, 871980b • 4 ♀♀; Chishui, Yaozhangou; 23 Sep. 2000; Yun Ma leg.; ZJUH No. 200103302 • 3 ♀♀; same data as for preceding; *Alsophila spinulosa* Nature Reserve; 21 Sep. 2000; Yun Ma leg.; ZJUH Nos 200103224, 200103250, 200103261. – **Guangdong** • 1 ♀; Zhaoqing, Dinghu Mt. Nature Reserve; 6–7 Apr. 2002; Zaifu Xu leg.; ZJUH No. 20026564. – **Guangxi Zhuangzu Zizhiqu** • 1 ♀; Sanjiang; Oct. 1982; Yi Mei leg.; ZJUH No. 826503.

Description

Female

MEASUREMENTS. Length of body 4.7 mm, of fore wing 3.7 mm.

COLOURATION. Yellow; stemmaticum, mesosoma, second tergite laterally, third tergite mostly and hind tibial patch dark brown; pterostigma, parastigma, veins 1-M, r, 3-SR, 2-M, 2-SR, 1-SR+M, 1-CU1, cu-a of fore wing and hind femur brown.

HEAD. Width $1.4 \times$ median length in anterior view (Fig. 38E) and part of head above eye in lateral view $0.3 \times$ height of eye (Fig. 38D); antenna with 23 segments, $1.1 \times$ as long as fore wing, five subapical segments moniliform (Fig. 38F); area of stemmaticum mainly granulate; OOL: diameter of posterior ocellus: POL = 30: 12: 11; eye $1.5 \times$ as long as temple in dorsal view (Fig. 38C); frons with longitudinally

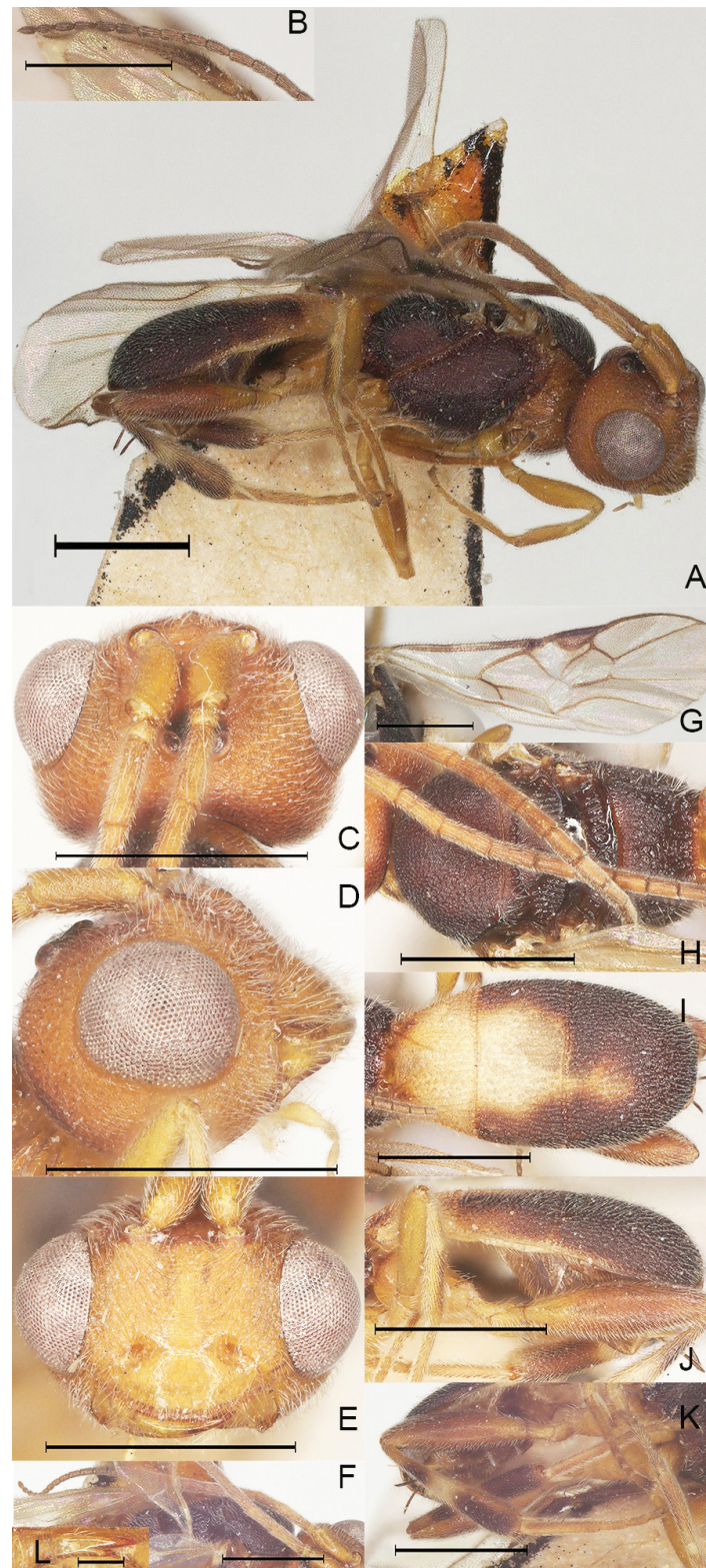


Fig. 38. *Phanerotoma zhaoi* sp. nov. **A, C–L.** Holotype, ♀ (ZJUH No. 200003241). **B.** Paratype, ♂ (ZJUH No. 995193). **A.** Habitus, lateral view. **B.** Apical antenna, lateral view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Antenna, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Hind leg. **L.** Mandible, ventral view. Scale bars: A–K=1 mm; L=0.2 mm.

rugae medially, rugose laterally and with weak median ridge; vertex and temple granulate-rugose and with satin sheen; face obliquely rugose laterally and transversely rugose and with short median carina dorsally; clypeus smooth and shiny, $0.9 \times$ minimum width of face, intertentorial distance $2.5 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 minute teeth medio-ventrally (Fig. 38E); eye large, in lateral view $1.8 \times$ as wide as temple (Fig. 38D), in anterior view its height $0.7 \times$ minimum width of face; upper condyle of mandible close to lower level of eyes (Fig. 38E); malar space $1.3 \times$ as long as basal width of mandible; lower tooth of mandible $0.2 \times$ length of apical tooth, short and minute (Fig. 38L).

MESOSOMA (Fig. 38H). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 38H); scutellum triangular, flat, punctate-rugose and rather shiny; metanotum without median carina or small tooth; propodeum coarsely reticulate-rugose, no lateral tubercles or transverse and median carinae.

WINGS. Fore wing $2.9 \times$ as long as its maximum width; 1-R1 $1.7 \times$ as long as pterostigma; r of fore wing $0.3 \times$ as long as 3-SR; distance between 1-R1 and wing apex $0.3 \times$ 1-R1; 2-SR curved (Fig. 38G); SR1 straight; 2-SR+M present; pterostigma large, parastigma medium-sized; 1-CU1 $0.4 \times$ as long as vein 2-CU1, cu-a oblique and $0.8 \times$ as long as 1-CU1; r: 3-SR: SR1 = 8:26:97; 2-SR: 3-SR: r-m = 45:26:17; 2-M straight posteriorly and bent anteriorly (Fig. 38G).

LEGS (Fig. 38K). Hind femur with satin sheen, $3.5 \times$ as long as wide and widened submedially; hind tibia rather swollen and with dark brown patch; middle tibia with large pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 38I–J). Carapace elliptical in dorsal view, $1.8 \times$ as long as wide and as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture normal; third tergite $1.5 \times$ as long as second tergite and laterally weakly curved, in dorsal view densely rugose and truncate (Fig. 38I), lateral lamella wide, posteriorly weakly emarginate; ovipositor sheath narrow (Fig. 38J), with some long and erect setae; hypopygium apically acute and with up-curved short triangular protuberance (Fig. 38J).

VARIATION. Length of fore wing 2.4–3.9mm; vein 1-R1 of fore wing 1.4 – $1.7 \times$ as long as pterostigma; eye in lateral view 1.8 – $2.2 \times$ as wide as temple, metasomal carapace in dorsal view 1.8 – $2.2 \times$ as long as wide, third tergite concave medio-posteriorly in dorsal view.

Male

Very similar to female, but five subapical segments cylindrical (Fig. 38B), third tergite in dorsal view almost without emargination.

Host

Unknown.

Distribution

China (Anhui, Zhejiang, Yunnan, Xizang Zizhiqu, Guizhou, Hubei, Guangdong, Guangxi Zhuangzu Zizhiqu).

Phanerotoma zhejiangensis sp. nov.

urn:lsid:zoobank.org:act:66F201B3-E607-4FC8-B03D-1A24438E7660

Fig. 39

Diagnosis

Ninth segment of female antenna swollen, 9th–23rd segments gradually narrowed (Fig. 39F); third tergite twice as long as second tergite and without emargination posteriorly; clypeus intertentorial distance $1.3 \times$ as long as minimum width between clypeus and eye (Fig. 38E); clypeus with pair of medium-sized teeth and a blunt tubercle in between (Fig. 39E); eye in dorsal view $1.7\text{--}1.8 \times$ as long as temple (Fig. 39C).

Etymology

Named after collection site in Zhejiang.

Type material

Holotype

CHINA – Zhejiang • ♀; Anji, Longwang Mt.; 20 Sep. 2004; Xuexin Chen leg.; ZJUH No. 200500005.

Paratypes (18 ♀♀, 2 ♂♂)

CHINA – Zhejiang • 8 ♀♀; same data as for holotype; ZJUH Nos 20049996 to 20050001, 20050008, 20080011 • 1 ♂; same data as for preceding; Belokobylskij leg.; ZJUH No. 200500024 • 8 ♀♀; same data as for preceding; ZJUH Nos 200500017 to 200500019, 200500025 to 200500027, 200500029, 200500031 • 1 ♂; same data as for preceding; 31 Aug. 1993; Junhua He leg.; ZJUH No. 9310725 • 1 ♀; same data as for preceding; 18 Oct. 1995; Hong Wu leg.; ZJUH No. 970278 • 1 ♀; Linan, Tianmu Mt.; 1 Jun. 1999; Mingshui Zhao leg.; ZJUH No. 20003276.

Description

Female

MEASUREMENTS. Length of body 4.3 mm, of fore wing 3.5 mm.

COLOURATION. Yellowish brown; stemmaticum dark brown; teeth of mandible and hind tibial patch brown.

HEAD. Width $1.4 \times$ median length in anterior view (Fig. 39E) and part of head above eye in lateral view $0.4 \times$ height of eye (Fig. 39D); antenna with 23 cylindrical segments, $1.1 \times$ as long as fore wing, from 9th segment shortened, 9th–23rd segments gradually narrowed (Fig. 39F); area of stemmaticum mainly granulate; OOL:diameter of posterior ocellus:POL=26:11:5; eye $1.5 \times$ as long as temple in dorsal view (Fig. 39C); frons with oblique rugae medially, rugose laterally and with median ridge; vertex granulate-rugose and with satin sheen; temple largely striate and with satin sheen; face with oblique rugae laterally and transversely rugose, with short median ridge anteriorly; clypeus smooth and shiny, $0.8 \times$ minimum width of face, intertentorial distance $1.3 \times$ minimum width between clypeus and eye, clypeus long erect setose and with 3 minute and closely placed teeth medio-ventrally (Fig. 39E); eye large, in lateral view $1.5 \times$ as wide as temple (Fig. 39D), in anterior view its height $0.8 \times$ minimum width of face; upper condyle of mandible far below lower level of eyes (Fig. 39E); malar space $1.2 \times$ as long as basal width of mandible; lower tooth of mandible $0.5 \times$ length of apical tooth, medium-sized and robust (Fig. 39L).

MESOSOMA (Fig. 39H). Length $1.5 \times$ its width in lateral view; side of pronotum mainly rugose, but dorsally nearly smooth; mesoscutum densely rugose and rather shiny, densely setose; notauli hardly indicated; scutellar sulcus wide (Fig. 39H); scutellum triangular, flat, punctate-rugose and rather shiny;

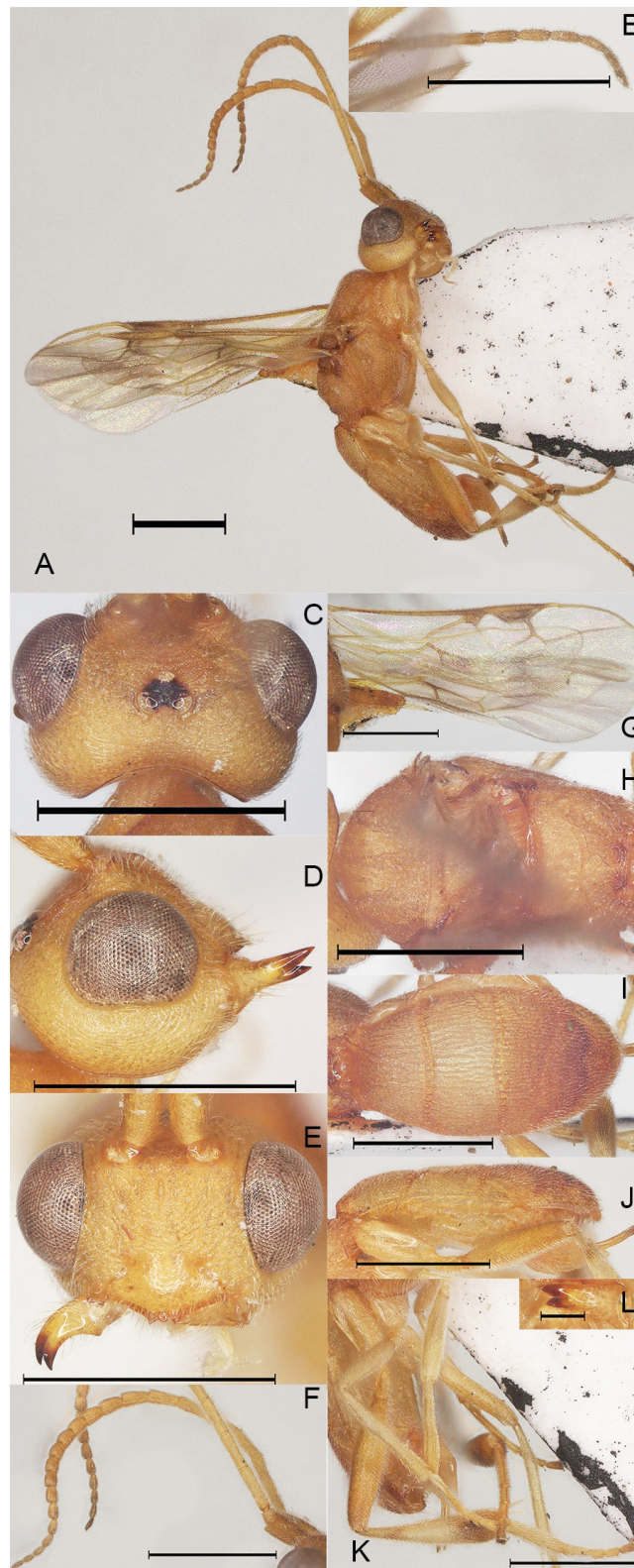


Fig. 39. *Phanerotoma zhejiangensis* sp. nov. **A, C–L.** Holotype, ♀ (ZJUH No. 200500005). **B.** Paratype, ♂ (ZJUH No. 200500024). **A.** Habitus, lateral view. **B.** Apical antenna, lateral view. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Head, anterior view. **F.** Antenna, lateral view. **G.** Fore wing. **H.** Mesosoma, dorsal view. **I.** First third of metasomal tergites, dorsal view. **J.** Metasoma, lateral view. **K.** Hind leg. **L.** Mandible, ventral view. Scale bars: A–K = 1 mm; L = 0.2 mm.

metanotum without median carina or tooth; propodeum coarsely reticulate-rugose, no lateral tubercles, no transverse or median carinae.

WINGS. Length of 1-R1 $1.5\times$ as long as pterostigma; r of fore wing as long as 3-SR; distance between 1-R1 and wing apex $0.3\times$ 1-R1; 2-SR bent (Fig. 39G); SR1 straight; 2-SR+M present; pterostigma large, parastigma medium-sized; 1-CU1 $0.4\times$ as long as vein 2-CU1, cu-a oblique and $0.9\times$ as long as 1-CU1; r: 3-SR: SR1 = 16: 16: 89; 2-SR: 3-SR: r-m = 41: 16: 19; 2-M straight posteriorly and bent anteriorly; second submarginal cell slender (Fig. 39G).

LEGS (Fig. 39K). Hind femur with satin sheen, $4.3\times$ as long as wide and submedially widened; hind tibia swollen and with brown patch; middle tibia with large pale-yellow blister; hind coxa smooth and shiny.

METASOMA (Fig. 39I–J). Carapace elliptical in dorsal view, $1.8\times$ as long as wide and $1.1\times$ as long as mesosoma; first and second tergites coarsely and densely longitudinally rugose; second suture wide; third tergite $2.0\times$ as long as second tergite and laterally weakly curved, in dorsal view densely rugose and convex (Fig. 39I), lateral lamella wide, without emargination; ovipositor sheath narrow (Fig. 39J), with some long and erect setae; hypopygium apically acute and no triangular protuberance (Fig. 39J).

VARIATION. Length of fore wing 2.9–3.7 mm; eye $1.3\text{--}1.5\times$ as long as temple in dorsal view; shape of metasoma carapace more or less slender, third tergite $1.6\text{--}2.0\times$ as long as second tergite in dorsal view.

Male

Very similar to female, but antennal segments cylindrical and less shortened (Fig. 39B).

Host

Unknown.

Distribution

China (Zhejiang).

Key to Chinese species of the genus *Phanerotoma* Wesmael, 1838

1. Lower tooth of mandible as long as apical tooth (Fig. 17L); temple in dorsal view distinctly narrowed posteriorly and nearly straight (Fig. 17C); third metasomal tergite truncate apically, with hyaline lamella and its margin finely serrate in dorsal view (Fig. 17I) 2
- Lower tooth of mandible shorter than apical tooth or subequal (Figs 22K, 25N); temple in dorsal view convex or gradually narrowed (Figs 18C, 19B); third tergite truncate, rounded or concave posteriorly, its lamella hyaline and simple (Fig. 15I, 16I) or with weak serrations in dorsal view... 3
2. Frons punctate-rugose and coriaceous (Fig. 17C); head in lateral view protruding dorsally and ocelli invisible (Fig. 17D); apical antennal segment of female much longer than subapical segments (Fig. 17K); length of vein 1-R1 about $1.5\times$ as long as pterostigma (Fig. 17G), vein 1-CU1 $0.6\times$ as long as vein 2-CU1; hypopygium apically acute, lacking an up-curved triangle or apical spine (Fig. 17I) *P. macrodentata* sp. nov.
- Frons densely granulate; head in lateral view almost rounded dorsally without distinct protrusion and ocelli visible; apical antennal segments of female shorter than subapical segments; length of vein 1-R1 about $1.3\times$ as long as pterostigma, vein 1-CU1 $0.4\times$ as long as vein 2-CU1; hypopygium truncate apically *P. conopomorphae* Tsang, You & van Achterberg, 2011
3. Length of body 6–9 mm; vein 1-CU1 of fore wing about as long as vein 2-CU1 or distinctly longer (Fig. 10F); flagellum of antenna slender and gradually narrowed, subapical segments of antenna

- parallel-sided medially (Fig. 10E); metanotum with complete median carina (Fig. 10G); [malar space about as long as basal width of mandible; head moderately emarginate medio-posteriorly; eyes strongly protruding (Fig. 10B, D); vein 1-M of fore wing yellow] *P. flava* Ashmead, 1906
- Length of body 3–5 mm; vein 1-CU1 of fore wing distinct shorter than vein 2-CU1 (Figs 5F, 26E); flagellum of antenna not gradually narrowed, subapical segments of antenna swollen medially or moniliform (Figs 5J, 26J); metanotum with short median carina anteriorly or without median carina (Figs 5G, 26F)..... 4
4. Lateral sides of third tergite of metasoma in dorsal view straight and directly narrowing posteriorly, nearly triangular (Fig. 26G); in lateral view metasomal carapace rather flat and thin, but with triangular convex area posteriorly (Fig. 26H); 4–5 subapical segments of female antenna moniliform (Fig. 26J)..... 5
- Lateral sides of third tergite of metasoma in dorsal view rounded and gradually narrowing posteriorly (Fig. 28H); in lateral view metasomal carapace more convex and thicker (Fig. 28E); if rather flat, then no triangular convex area posteriorly (Fig. 31C); subapical segments of female antenna often not moniliform (Fig. 31F)..... 6
5. Third tergite of metasoma triangular in dorsal view, ending in narrow rounded apex and flat in lateral view (Fig. 26G); hypopygium apically with medium-sized and robust protuberance (Fig. 26H); ovipositor sheath not needle-shaped; clypeus with three large and robust teeth medio-ventrally (Fig. 26D); head deeply emarginate medio-posteriorly (Fig. 26B); face semi-circularly rugose; penultimate antennal segment as long as wide in lateral view (Fig. 26J); eye medium-sized, $1.4 \times$ temple in dorsal view; [second metasomal suture rather curved; lower tooth of mandible small and robust (Fig. 26K); subapical antennal segments of female small and moniliform (Fig. 26J); hind tibia usually with faint brownish subbasal patch and widened medially (Fig. 26I); vein 1-CU1 $0.5\text{--}0.6 \times$ as long as vein 2-CU1 (Fig. 26E)] *P. producta* Watanabe, 1937
- Third tergite of metasoma less narrowed posteriorly (Fig. 5H), if rather narrowed and flat posteriorly then tergite apically truncate in dorsal view (Fig. 5H); prolongation of hypopygium of female slender and much longer than its basal width (Fig. 5E); ovipositor sheath needle-shaped (Fig. 5E); clypeus with three minute teeth medio-ventrally, partly hidden by conspicuous fringe of setae (Fig. 5D); head less emarginate medio-posteriorly (Fig. 5B); face coarsely rugose; penultimate segment $1.4 \times$ as long as wide in lateral view (Fig. 5J); eye large, eye $1.7 \times$ as long as temple in dorsal view [similar to *P. acuminata* Szépligeti, 1908 reported from Korea and Far East Russia; however, this species has a short triangular protuberance at the apex of the female hypopygium (not longer than basal width), parastigma dark brown, ovipositor sheath less needle-shaped and vein r of the fore wing $0.2\text{--}0.3 \times$ as long as vein 3-SR] *P. brunneivena* van Achterberg, 2021
6. Antenna with 25–27 segments and 15 subapical segments of female strongly shortened, partly modified by having a small prolongation; scapus distinctly swollen, $3 \times$ as wide as following antennal segments; [body 4–8 mm] *P. potanini* Kokujev, 1895
- Antenna with 23 segments, antenna of female with at most 8 shortened subapical segments and these segments without a prolongation; scapus not swollen, about twice as wide as following antennal segments or less 7
7. Marginal cell of fore wing small, vein 1-R1 almost as long as pterostigma and distance between vein 1-R1 and wing apex $0.9\text{--}1.0 \times$ as long as vein 1-R1 (Figs 19F, 28E); vein r $0.5 \times$ as long as vein 3-SR; temple smooth or slightly punctate-rugose (Figs 19C, 28C); eye in dorsal view $2.3\text{--}3.0 \times$ as long as temple (Fig. 19A)..... 8
- Marginal cell of fore wing medium-sized to large, vein 1-R1 mostly longer than pterostigma and distance between vein 1-R1 and wing apex $0.2\text{--}0.6 \times$ as long as vein 1-R1 (Fig. 15G), if vein 1-R1

- almost as long as pterostigma, then distance between vein 1-R1 and wing apex $0.6 \times$ as long as vein 1-R1 (Fig. 27F) or vein r as long as vein 3-SR; temple mostly striate (Fig. 27C); eye $1.1\text{--}2.1 \times$ as long as temple in dorsal view (Fig. 3A) 9
8. Third metasomal tergite largely smooth; scapus comparatively wide in lateral view (van Achterberg 1990: fig. 222); second submarginal cell of fore wing slender, vein 2-SR of fore wing $4.7 \times$ vein r (Fig. 28F); metasomal carapace elliptical in dorsal view (Fig. 28H), $2.0 \times$ as long as wide; medial length of third tergite about $1.8 \times$ medial length of second tergite, with apical hyaline lamella and its margin finely serrate posteriorly; length of malar space about $1.2 \times$ basal width of mandible (Fig. 28D); clypeus with three large and robust teeth medio-ventrally; POL as long as maximum diameter of posterior ocellus (Fig. 28B)..... *P. semenowi* Kokujev, 1900
- Third tergite very finely rugulose; scapus comparatively narrow in lateral view (van Achterberg 1990: fig. 246); second submarginal cell of fore wing wide, vein 2-SR of fore wing $2.5 \times$ vein r (Fig. 19F); metasomal carapace oval in dorsal view, $1.7 \times$ as long as wide (Fig. 19H); medial length of third tergite about $1.5 \times$ medial length of second tergite, in dorsal view without apical hyaline lamella posteriorly; length of malar space about equal to basal width of mandible (Fig. 19K); clypeus with three minute teeth medio-ventrally; POL $0.4 \times$ maximum diameter of posterior ocellus (Fig. 19B)..... *P. minuta* Kokujev, 1903
9. Both teeth of mandible blunt and of subequal length (Fig. 3K); first discal cell of fore wing comparatively wide (Fig. 3F); second submarginal cell large and wide; first and second tergites of metasoma coarsely rugose; [third tergite densely and coarsely rugose (Fig. 3H); temple as long as eye in dorsal view (Fig. 3B); hind tibia less swollen (Fig. 3E); mesosternum with satin sheen and superficially coriaceous; parastigma dark brown and vein 1-M of fore wing brown]..... *P. aequidentata* sp. nov.
- Both teeth of mandible acute and apical tooth longer than lower tooth (Fig. 6J), rarely subequal; first discal cell of fore wing narrower (Fig. 6F); second submarginal cell of fore wing slender or widened; first and second tergites of metasoma coarsely and densely longitudinally rugose (Fig. 6G)..... 10
10. Vein cu-a of fore wing strongly inclivous (Fig. 6E) and $1.2\text{--}1.4 \times$ as long as vein 3-CU1; vein 1-M of fore wing distinctly wider than vein 2-CU1 (Fig. 6E); vein r of fore wing widened [hind basitarsus distinctly contrasting with hind tibia] 11
- Vein cu-a of fore wing moderately inclivous to vertical (Fig. 21F) and about as long as vein 3-CU1, rarely up to $1.2 \times$ and if strongly inclivous (in *P. formosana*; Fig. 12G) then vein cu-a as long as vein 3-CU1; vein 1-M of fore wing about as wide as vein 2-CU1; vein r more slender (and vein 3-SR of fore wing at most $8 \times$ as long as vein r) 12
11. Vein r of fore wing medium-sized (Fig. 15G), vein 3-SR about twice as long as vein r; vein 1-CU1 comparatively long (Fig. 15G); vein 1-M of fore wing brown; apical tooth of mandible robust (Fig. 15L); temple comparatively wide, in lateral view about as wide as eye (Fig. 15D); clypeus with three slender and large teeth (Fig. 15E) [fore wing with dark bands; stemmaticum small (Fig. 15G)] *P. inclinata* sp. nov.
- Vein r of fore wing extremely short (Fig. 6E), vein 3-SR about $12 \times$ as long as vein r; vein 1-CU1 of fore wing comparatively short (Fig. 6E); vein 1-M of fore wing yellowish; apical tooth of mandible comparatively slender (Fig. 6J); eye small and in lateral view $0.9 \times$ as wide as temple (Fig. 6C); clypeus with three minute teeth (Fig. 6D) [fore wing with brown patches (Fig. 6E); hind basitarsus white and strongly contrasting to dark brown hind tibia (Fig. 6I); vein 2-CU1 of fore wing curved basally in holotype but straight in paratype]..... *P. coronaria* sp. nov.

12. Face in lateral view with small spine-like protuberances (Fig. 21C); clypeus triangular convex anteriorly and with some longitudinal sculpture (Fig. 21D); malar space $1.7\times$ as long as basal width of mandible (Fig. 21D) [POL about as long as diameter of posterior ocellus (Fig. 21B); hypopygium apically acute with protuberance curved up, short and robust triangular (Fig. 21J)] *P. nigricornis* sp. nov.
- Face in lateral view without teeth-like protuberances (Fig. 22D); clypeus evenly convex anteriorly and at most punctate-rugose (Fig. 22D); malar space $0.4\text{--}1.4\times$ as long as basal width of mandible 13
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- 41. Clypeus with three minute teeth medio-ventrally (Fig. 8D); hind tibia with yellowish brown patch basally and apically (Fig. 8J); eye in lateral view $1.9\times$ as wide as temple (Fig. 8C) [second metasomal suture slightly sinuate; 6–8 subapical antennal segments of female modified (Fig. 8E); upper condyle of mandible approaching lower level of eyes; malar space $0.6\times$ as long as basal width of mandible] *P. duae* sp. nov.
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Discussion

Only recently, the morphology of the mandible and of the female hypopygium in *Phanerotoma* have been studied and well illustrated (e.g., van Achterberg 2021). In this subfamily, there are distinct differences in the mandibular teeth among species in the genera *Phanerotoma* and *Phanerotomella*. However, no species of *Phanerotomella* have been found with completely identical teeth, as in *P. macrodentata* sp. nov. The prolongation of the female hypopygium is a feature found only in *Phanerotoma* and *Siniphanerotomella* (Yao *et al.* 2023), but while the hypopygium is prolonged in females of all *Siniphanerotomella*, it is prolonged in some *Phanerotoma* but not others, which therefore resemble the hypopygium in *Phanerotomella* and *Wushenia* (Zhao *et al.* 2023). Maybe this indicates evolutionary links, although no thorough molecular analysis of the subfamily exists. In this study, these characters of the Chinese species are dealt with in a systematic way, identifying 24 new species and significantly

enriching the taxonomic knowledge of this genus in China, expanding its number from 14 to 44. The morphological characteristics of the hypopygium are potentially correlated with the parasitoid wasps' oviposition behaviour and the variation in the lower tooth of the mandible may facilitate emergence from the cocoon or provide complementary support to the upper tooth. The next goal is to integrate molecular biology, phylogenetic analysis, and biological and morphological data to elucidate the correlations between the morphological traits of various species and their oviposition behaviors and emergence patterns.

Several lepidopteran pests represent a considerable problem in horticultural and agricultural systems and the parasitoids of this genus hold significant potential for deployment as biological control agents. Unfortunately, only a fraction of the newly described species have known hosts. The life cycle of these parasitoids involves the deposition of eggs within the host's eggs, with the parasitoid larvae developing and ultimately causing the demise of the host larvae during their later instars (Shaw 1997). In light of this biological trait, future entomological surveys may benefit from extensive collecting of infested lepidopteran larvae combined with barcoding, thereby facilitating a more precise identification and documentation of the hosts associated with these parasitoids.

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