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A new genus and species of Ichneumonini Latreille (Hymenoptera, Ichneumonidae, Ichneumoninae) from Oriental Region

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Abstract. *Serratichneumon* Riedel & Sheng gen. nov. and *Serratichneumon maculatus* Sheng & Riedel gen. et sp. nov. belonging to the tribe Ichneumonini of subfamily Ichneumoninae (Hymenoptera: Ichneumonidae), collected in the Oriental Region (China, Vietnam, and Indonesia), are described and illustrated. The new genus is placed in Tereshkin's key to the Palaearctic genera of the subtribe Amblytelina, and compared with similar genera, *Hepiopelmus* Wesmael, 1845, and *Tricholabus* Thomson, 1894.

Keywords. Amblytelina, *Serratichneumon*, new genus, new species, taxonomy.

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Introduction

According to the Ichneumonoidea Latreille, 1802 catalogue (Yu *et al.* 2016), the tribe Ichneumonini Latreille, 1802, of the subfamily Ichneumoninae Latreille, 1802 (Hymenoptera, Ichneumonidae), comprises 214 genera and 2711 species, of which 68 genera and 278 species are known from the Oriental Region.

Members of the subfamily Ichneumoninae have been grouped into several tribes and subtribes in the past (Heinrich 1967a; Yu *et al.* 2016). Within the tribe Ichneumonini Latreille, 1802, the proposed subtribe Amblytelina Viereck, 1918 (Amblytelinae sensu Viereck 1918; Heinrich 1967a, 1967b) is characterized

by an amblypygous metasoma of female (hypopygium nearly concealing the less robust ovipositor), gastrocoeli indistinct or at most moderately impressed, and thyridia obsolete or inconspicuous. Although an actual investigation using the genomic data has shown that many of these tribal and subtribal definitions do not reflect evolutionary relationships (Santos *et al.* 2021), the morphological characters proposed by Heinrich (1967b) and Tereshkin (2011) are still useful for the identification of the large number of genera within the tribe Ichneumonini.

The Oriental genera of the tribe Ichneumonini were keyed in Townes *et al.* (1961) under the name "Joppini", but this key is incomplete and largely outdated now. For the Palaearctic genera of the subtribe Amblytelina sensu Heinrich (1967a), a newer illustrated key and detailed generical diagnoses was provided by Tereshkin (2011).

In this contribution, we describe a new genus and its type species which is distributed in East and Southeast Asia, belonging to the subtribe Amblytelina sensu Heinrich (1967a).

Materials and methods

The holotype and one paratype, deposited in the Insect Museum, Center for Biological Disaster Prevention and Control (CBDPC), National Forestry and Grassland Administration, Shenyang, P.R. China, were collected by first author using entomological nets in the forest of Nansha, Guangzhou, Guangdong province, China, where is a forest mainly comprised of *Castanopsis fabri* Hance, *Cyclobalanopsis* sp., *Ficus benjamina* L., *F. concinna* Miq., *Gryptocarya* sp., *Litchi chinensis* Sonn., *Mallotus paniculatus* (Lam.) Muell.-Arg., *Photinia* sp., *Rhamnus* sp., *Rhododendron simsii* Planch., *Stauntonia* sp. Other paratypes and research specimens are from the collection of Zoologische Staatssamlung Munchen (ZSM), Naturalis Biodiversity Center, Leiden (RMNH), the School of Science, University of Hongkong, (HKU) and in the personal collection of the second author (coll. Riedel).

Morphological terminology follows Broad *et al.* (2018). Measurements and photographs of the new species were made under a Leica M205A stereo microscope with LAS Montage MultiFocus. The final images were edited in Adobe Photoshop CC.

Results

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Superfamily Ichneumonoidea Latreille, 1802
Family Ichneumonidae Latreille, 1802
Subfamily Ichneumoninae Latreille, 1802

Serratichneumon Riedel & Sheng gen. nov.
urn:lsid:zoobank.org:act:AE05BC3D-BF79-494D-B16E-FC48F5BED305

Type species

Serratichneumon maculatus Sheng & Riedel gen. et sp. nov.

Etymology

The name of the new genus is based on the male's serrated flagellomeres. The gender is masculine.

Diagnosis

Flagellum of female slightly lanceolate, of male strongly serrate (Fig. 14). Clypeus flat, with slightly widened and leaf-like lateral parts, apical margin almost straight. Mandible (Fig. 3) with two rather

distinctly separated teeth, lower tooth smaller than upper tooth and slightly bent inwards. Genal carina reaching hypostomal carina close to the base of mandible. Gena (Figs 4–5) not or slightly narrowed behind the eye. Occiput strongly concave medially. Notaulus short, pit-like impressed on frontal margin of mesoscutum. Mesoscutum densely punctate. Scutellum slightly to moderately convex and wider than long, not carinate laterally. Mesopleuron rugose-punctate; sternaulus not impressed. Epicnemial carina low, dorsally reaching center of mesopleuron at or close to its frontal margin. Juxtacoxal carina absent. Propodeum rounded in profile but slightly differentiated in a shorter basal ± horizontal and longer apical vertical part, coarsely rugose-punctate, without apophysis; propodeal spiracle oval or slit-shaped; carination of propodeum largely obsolete, at least in females. Area basalis with a small median tubercle. Area superomedia absent or incomplete; anterior transverse carina (costula) absent or weak. Hind coxa without scopa. Claws simple. Metasoma strongly amblypygous. Gastrocoelus distinctly impressed, with some fine longitudinal ridges. Thyridium oblique, ca 0.7× as wide as the interval between thyridia. 2nd to 4th sternites with median membranous folds. Ovipositor sheath short, not surpassing metasomal apex. Hypopygium of female very similar to male, not modified, apical margin wide, slightly rounded.

This new genus belongs to the group of amblypygous genera (subtribe Amblytelina sensu Heinrich, 1967a) of the tribe Ichneumonini. It is characterized by the structure of the head and propodeum, and in males also by the strongly serrate flagellum (similar to *Pristiceros* Heinrich, 1961). In the keys to the Oriental Ichneumoninae (Townes *et al.* 1961) and Palaearctic genera of Amblytelina (Tereshkin 2011), this genus runs to *Hepiopelmus* Wesmael, 1845, but strongly differs by several morphological features such as carination of propodeum, lack of median tubercle of area basalis, and strongly serrate flagellum of males.

Overall, the new genus is similar to *Hepiopelmus* and *Tricholabus* Thomson, 1894 in having a pentagonal areolet; notauli vestigial at anterior end; hind margin of metanotum with lateral projections; gastrocoeli rather large and deep, thyridia present; propodeum without apophyses; hind tibiae without white rings; 2nd and 3rd sternites with longitudinal fold or unsclerotized predominantly. These three genera can be distinguished by the following key.

Key to similar genera, *Serratichneumon* gen. nov., *Hepiopelmus* and *Tricholabus*

1. Propodeum of female without distinct carinae. Scutellum slightly convex. 4th sternite predominantly sclerotized. Hypopygium (Figs 3–4) not distally produced, only slightly concave in the middle. Flagellum of male without tyloids, and strongly serrate. Oriental ..... ***Serratichneumon*** Riedel & Sheng gen. nov.
– Propodeum of female with distinct carinae. Scutellum strongly convex. 4th sternite predominantly unsclerotized. Hypopygium more or less medially produced. Flagellum of male with or without tyloids, and not serrate 2

2. Occipital carina joining hypostomal carina at base of mandible. Thyridium narrower than the distance between thyridia. Area basalis with tubercle. Area superomedia approximately square, or narrowed posteriorly. Flagellum of male with tyloides. Hypopygium of males slightly produced medio-distally, but without a knoll-shaped swelling. Palaearctic and Oriental ..... ***Hepiopelmus*** Wesmael, 1845
– Occipital carina joining hypostomal carina above base of mandible. Thyridium wider than the distance between them. Area basalis of propodeum without tubercle. Area superomedia hexagonal. Flagellum of male without tyloides. Hypopygium of male slightly produced medio-apically with characteristic knoll-shaped swelling. Holarctic ..... ***Tricholabus*** Thomson, 1894

Serratichneumon maculatus Sheng & Riedel gen. et sp. nov.
urn:lsid:zoobank.org:act:5D6E2E64-E998-4359-B6A1-66660E22FE36
Figs 1–17

Etymology

The name of the new species is based on the body with large white and red spots.

Material examined

Holotype

CHINA • ♀; Guangdong, Guangzhou, Nansha, Huangshanlu Forest Park; 22°48′ N, 113°33′ E; 12–80 m a.s.l.; 16 Apr. 2022; Mao-Ling Sheng and Ying Zhang leg.; CBDPC.

Paratypes

CHINA • 1 ♂; same collection data as for holotype; CBDPC • 1 ♂; Hongkong, Pat Sin Leng; 22°29′08″ N, 114°11′15″ E ; 140 m a.s.l.; 21 Mar.– 4 Apr. 2015; C. Barthélémy leg.; HKU.

VIETNAM • 3 ♀♀, 1 ♂; Viet Try nr Thanh Son, Thuong Cuu; 20°59′ N, 105°8′ E; 350–400 m a.s.l.; 11–16 Oct. 1999; Malaise traps; R. de Vries RMNH´99 leg.; RMNH • 1 ♂; same collection data as for preceding; 12–16 Oct. 1999; RMNH.

INDONESIA • 1 ♂; Sumatera Barat, Lahan basah, Andalas University, Padang; 0.933° S, 100.455° E; 156 m a.s.l.; 23 Jan. 2016; H. Hamid leg.; S16036, COI 658 (On) BOLD: ADE0927, INDOBIOSYS-CCDB26088-G02; ZSM • 1 ♂; same collection data as for preceding; 16 Jan. 2016; S16042, COI 658 (On) BOLD: ADE0927, INDOBIOSYS-CCDB26088-C08; ZSM.

Description

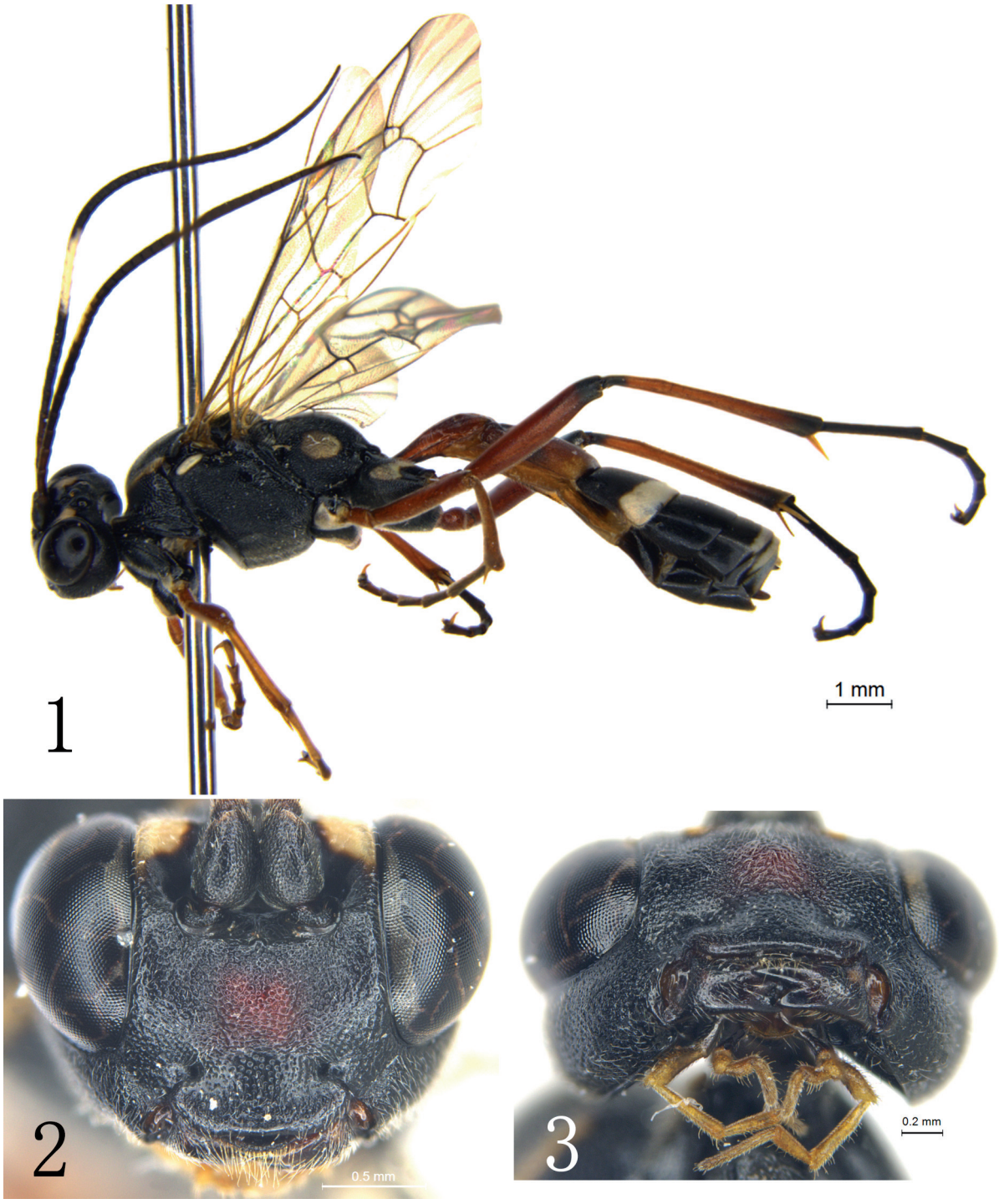
Female

Measurements. Body length 11.7–14.0 mm. Fore wing length 7.7–8.5 mm.

Head. Face (Fig. 2) approximately 1.9× as wide as long, with dense punctures, distance between punctures 0.2–0.5× diameter of puncture; median and lower lateral portion slightly convex; upper margin with small median tubercle. Clypeus flat, approximately 2.3× as wide as long, with slightly widened and leaf-like lateral parts; basal portion densely and apical sparsely weakly punctate; apical margin slightly arched forward. Apical margin of labrum with dense yellowish-brown setae. Mandible (Fig. 3) with two rather distinctly separated teeth, upper tooth much longer than lower tooth; lower tooth slightly bent inwards (by 30°). Malar space 0.8–0.9× as long as width of mandibular base. Subocular sulcus present. Gena (Figs 4–5) slightly and roundly narrowed behind eye, ca 0.5× as wide as eye; occiput strongly concave medially. Vertex (Fig. 5) punctate; ocelli small, distance between lateral ocellus and eye 2.0× ocellar diameter, post-ocellar line approximately 1.25× as long as ocular-ocellar line. Frons smooth ventrally, with some transverse rugae dorsally and a central longitudinal rim in front of anterior ocellus. Antenna with 44–46 flagellomeres, slightly lanceolate; ratio of length from first to fifth flagellomeres approximately: 10.7:8.6:7.6:7.3:7.1; first flagellomere 4.1× and second flagellomere 2.8× as long as wide; widest flagellomeres about square. Occipital carina reaching hypostomal carina close to mandibular base, hypostomal carina low.

Mesosoma. Side of pronotum with coarse punctures and some striae ventrally. Epomia absent. Mesoscutum (Fig. 6) shining, lateral margin between tegula and scutellum distinctly carina-shaped; with dense punctures, distance between punctures 0.2–1.0× diameter of puncture; notaulus pit-like impressed on frontal margin of mesoscutum. Scutellum slightly convex and slightly wider than long, weakly punctate, without lateral carina. Mesopleuron (Fig. 7) rugose-punctate; sternaulus not impressed.

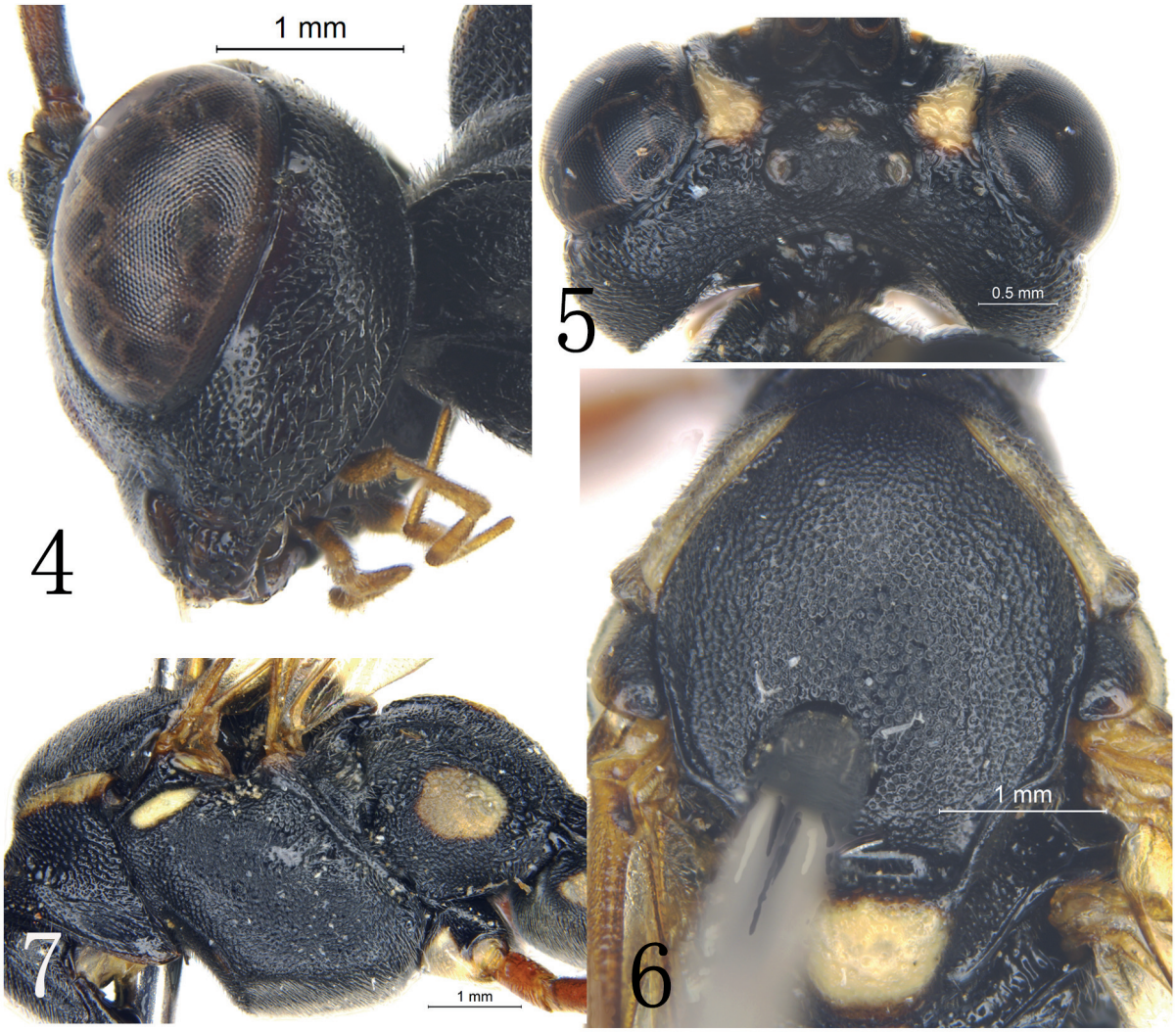
Epicnemial carina low, dorsally reaching center of mesopleuron close to its frontal margin. Metapleuron rugose-punctate; juxtacoxal carina absent. Hind coxa finely rugulose-punctate, without scopa. Hind femur slender, 5.9× as long as wide. Hind tibia externally with several short denticular spurs. Ratio of length of hind tarsomeres from first to fifth: 14.0:6.2:4.5:3.0:4.6. Claws simple (Fig. 9). Areolet (Fig. 8)



Figs 1–3. *Serratichneumon maculatus* Sheng & Riedel gen. et sp. nov., holotype, ♀ (CBDPC). **1**. Habitus, lateral view. **2**. Head, anterior view. **3**. Mandibles.

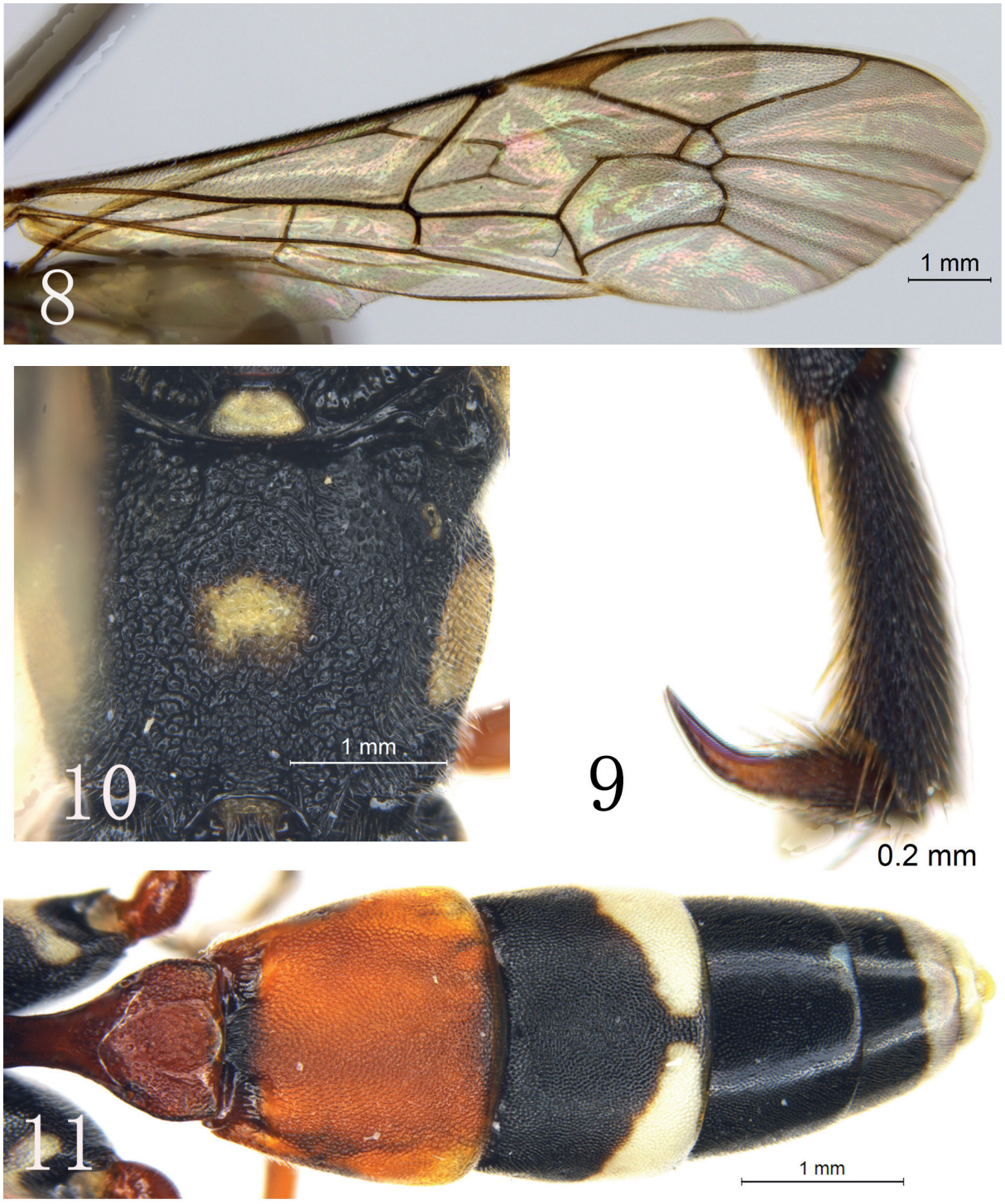
pentagonal, frontal distance between veins 2rs-m and 3rs-m 4× their diameter; vein 2m-cu reaching areolet distad its middle. Postnervulus intercepted about at lower 0.3. Hind wing vein M+CU straight; 1-cu 3.0× as long as cu-a. Propodeum (Fig. 10) coarsely but indistinctly rugose-punctate, not gradually sloping but with distinct horizontal basal part and descending apical part; propodeal carinae almost entirely absent; spiracle slit-shaped.

Metasoma. Distinctly amblypygous. Postpetiolus (Fig. 11) widened, 0.6× as long as maximum width; median field slightly elevated, without dorsal carina, coarsely punctate and with some fine aciculation. 2nd tergite approximately 1.4× as long as anterior width, and 0.95× as posterior width, with dense punctures, fine aciculation between gastrocoeli; gastrocoelus distinctly impressed, triangular, with some fine longitudinal ridges; thyridium oblique, ca 0.7–0.8× as wide as the interval. 3rd tergite parallel laterally, 0.7× as long as width; with sculpture as 2nd, 4th and 5th tergites with superficial punctures, shining; following tergites almost smooth. Hypopygium (Figs 12–13) completely covering ovipositor, apical margin slightly rounded. Ovipositor sheath not surpassing metasomal apex.



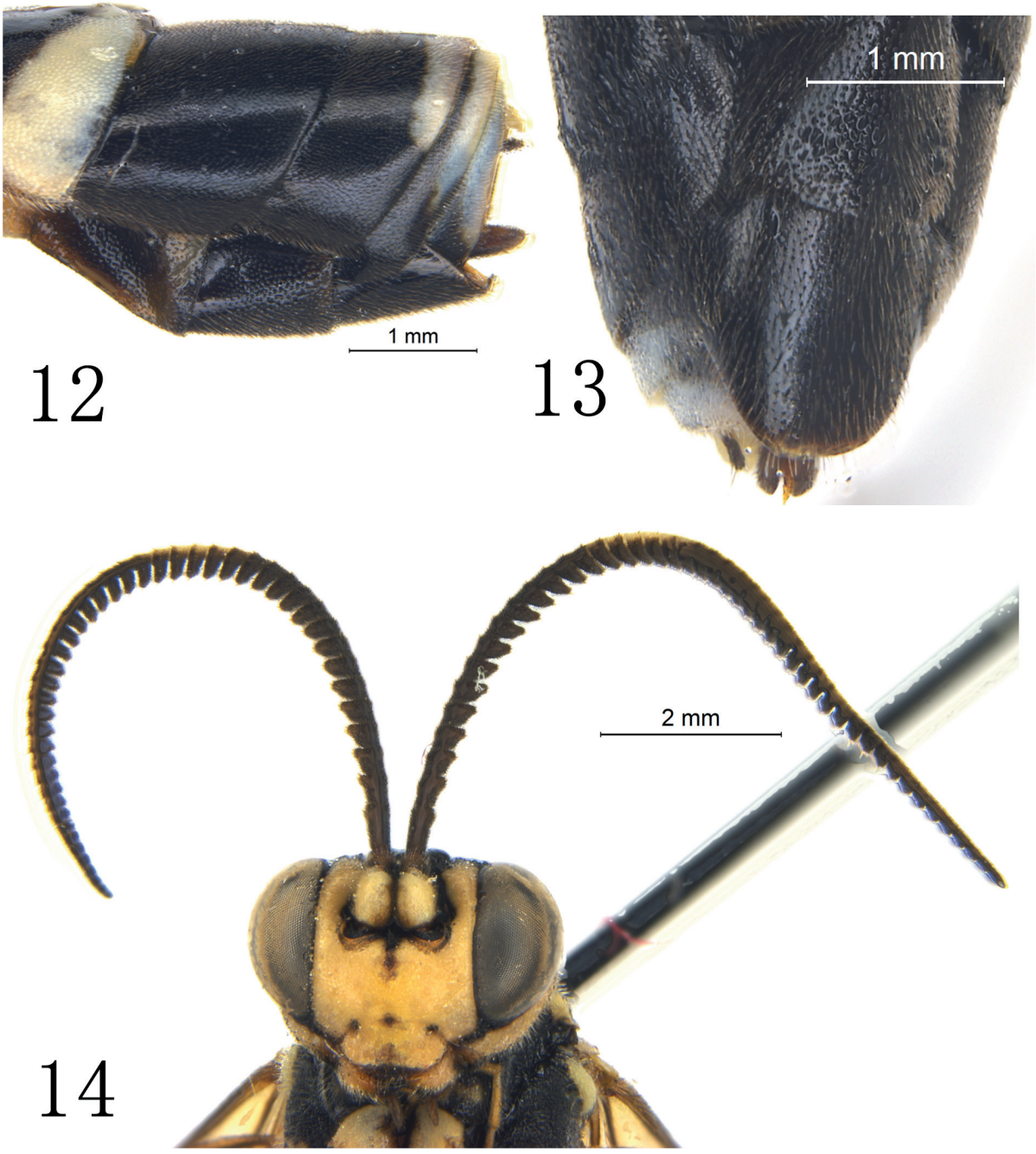
Figs 4–7. *Serratichneumon maculatus* Sheng & Riedel gen. et sp. nov., holotype, ♀ (CBDPC). **4**. Head, lateral view. **5**. Head, dorsal view. **6**. Mesoscutum and scutellum, dorsal view. **7**. Mesosoma, lateral view.

Coloration (Fig. 1). Black, except for the following: maxillary and labial palpi gray-brown, basal portion blackish brown; ventral annulus on flagellomeres 9–13 (14), drop-shaped spot on frontal orbit, hind edge or upper margin of pronotum, subtegular ridge, scutellum and postscutellum, central spot on metapleuron and spot on central propodeum (apical part of area superomedia), often posterolateral



Figs 8–11. *Serratichneumon maculatus* Sheng & Riedel gen. et sp. nov., holotype, ♀ (CBDPC). **8**. Fore wing. **9**. Apical portion of hind leg, lateral view. **10**. Propodeum. **11**. Metasoma, dorsal view.

marks on postpetiolus and on 2nd tergite, often apical band of 3rd tergite, sometimes apical spot on 4th tergite, always apical bands on 5th to 7th tergites, frontal spots on fore and mid coxae and dorsal spot on hind coxa cream-yellow or ivory; mandible centrally and central spot on face (sometimes indistinct) reddish; 1st and 2nd tergites red, sometimes 2nd tergite partly blackish basally and laterally; following tergites black. Wings hyaline, pterostigma yellowish or ochreous.



Figs 12–14. *Serratichneumon maculatus* Sheng & Riedel gen. et sp. nov. **12–13**. Holotype, ♀ (CBDPC). **12**. Apical portion of metasoma, lateral view. **13**. Apical portion of metasoma, ventral view. **14**. Paratype, ♂ (CBDPC), head, anterior view.

Male

Measurements. Body length 12.5–13.0 mm. Fore wing length 11.5 mm.

Head. Antenna (Fig. 14) with 45–46 flagellomeres; first flagellomere 1.8–2.0 × as long as width; 2nd flagellomeres onwards strongly serrate, without tyloids. Distance between lateral ocellus and compound eye 1.5 × ocellar diameter.

Mesosoma. Scutellum moderately elevated, 1.2 × as wide as long, without lateral carina. Anterior portion of latero-median longitudinal carina of propodeum present (Fig. 15), or area superomedia incomplete, ovoid, 1.5 × as long as wide; costula weak, reaching middle of area superomedia. Hind femur 4.7–5.5 × as long as wide. Areolet pentagonal, frontal distance between veins 2rs-m and 3rs-m 2–3 × their width.

Metasoma. 2nd tergite (Fig. 16) about as long as wide; thyridium wide, oblique, 1.3 × as wide as the interval. 2nd to 3rd or 4th sternites with central membranous folds. Apical margin of hypopygium (Fig. 17) slightly rounded.

Figs 15–17. *Serratichneumon maculatus* Sheng & Riedel gen. et sp. nov., paratype, ♂ (CBDPC). **15**. Propodeum. **16**. Metasoma, dorsal view. **17**. Apical portion of metasoma, ventral view.

Coloration. Black, except for following: stripes or rings on flagellomeres (14) 15–18, face except small median dark spot, clypeus, mandible except teeth, maxillary and labial palpi, frontal orbit up to lateral ocellus, gena and wide outer orbit, scape ventrally, collar and upper margin of pronotum, tegula, subtegular ridge, large spot on ventral mesopleuron, spot on metapleuron, scutellum, postscutellum, large mark of propodeum (covering apical half of area superomedia, basal half of area petiolaris and complete area posteroexterna), hind margin of postpetiolus, posterolateral spot on 2nd tergite, apical bands of 3rd to 7th tergites (on 3rd and 4th tergites narrowed medially), fore and mid coxae frontally, hind coxa dorsally and apically yellow or cream-yellow. 1st to 3rd tergites red, following tergites black. Legs except coxae including hind femur and fore and mid tarsi red; hind tibia basally and apically narrowly infuscate, hind tarsus black. Pterostigma yellow. Otherwise as described for the female. In males from Indonesia, basal flagellum ± ochreous and head and mesosoma with some dark-reddish suffusion around yellow spots.

Discussion

Traditionally, members of the Ichneumoninae have been grouped into several tribes and subtribes (Heinrich 1967a; Yu *et al.* 2016), that were shown to be paraphyletic in a recent work employing genomic ultraconserved elements (Santos *et al.* 2021). Therefore, the amblypygous metasoma of females have most probably been evolved several times in the evolution of different genera of Ichneumonini reflecting a common host use strategy for them. Although the hosts of this new and widespread Oriental genus *Serratichneumon* Riedel & Sheng gen. nov. are still unknown, the amblypygous metasoma of the females indicates a specialization on lepidopteran larvae (Santos *et al.* 2021).

Serratichneumon Riedel & Sheng gen. nov. has a rather isolated position within the tribe Ichneumonini. The small median tubercle of area basalis and the densely punctate postpetiolus is also present in the genera belonging to the *Barichneumon* complex but these genera have an oxypygous metasoma. Within the amblypygous genera of the Palaearctic and Oriental regions, *Serratichneumon* mostly resembles *Hepiopelmus* but the structural differences mentioned above do not indicate a close relation of these genera.

The modified male flagellum of this new genus is also present in few other genera of Ichneumoninae, e.g., *Pristiceros* (tribe Platylabini) and in some species of *Spilichneumon* Thomson, 1894 (tribe Ichneumonini), but its function is unknown yet.

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