



## Description of two new species of *Odopoa* Walker, 1871 (Hymenoptera: Chalcidoidea: Torymidae) from China, with a key to known species

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### Abstract

The genus *Odopoa* Walker, 1871 is recorded from China for the first time and two new species, *O. jianfengica* Xiao et Jiao **sp. nov.** and *O. wenchangica* Xiao et Hu **sp. nov.**, are described and illustrated. The world species are differentiated in a key, the first for the genus.

**Key words:** taxonomy, new species, Torymini

### Introduction

*Odopoa* was established by Walker (1871) for *O. atra* Walker from Sri Lanka. He stated that the genus “showed a way” to both Eurytomidae and Torymidae, having some characters of both families, but differed “very widely” from *Megastigmus* Dalman (Walker 1871: 36). *Odopoa* was placed in Megastigminae (Torymidae) by Ashmead (1904) in a key to genera, and Girault (1929) subsequently described a junior synonym, *Ua* Girault, in Miscogasteridae (= Miscogasterinae, Pteromalidae). When Bouček (1988) synonymized *Ua* under *Odopoa* he stated that such characters as a reticulated pronotum, more or less edged collar, and an elongated and sculptured petiole are reminiscent of some genera of Pteromalidae. Bouček (1978) was the first to study the single extant type specimen of *U. atra* after locating it in the BMNH. At that time he included *Odopoa* in Torymidae and treated *Pauliana* Risbec (1952) as a junior synonym. Subsequently, Bouček (1988) classified *Odopoa* as the only member of the tribe Odopoiini in the subfamily Toryminae, and treated *Australtorymus* Girault (1925), *Pauliana* and *Ua* all as junior synonyms. Grissell (1995) studied the known genera of Torymidae and classified *Odopoa* in Torymini based on the mesopleuron having a sinuate anterior margin, which is an autapomorphy of the tribe.

Until now, five valid species have been described in the genus (Noyes 2011). Two species, *O. dentatinota* (Girault 1925) and *O. josephinae* Bouček (1988), were described from Australia, *O. atra* from Sri Lanka, *O. philippiae* (Risbec 1952) from Madagascar, and *O. reticulata* (Sureshan 2007) from India. *Odopoa josephinae* was based on both sexes, whereas *O. philippiae* was described from males and the other three species based on females, though Bouček (1988) provided brief notes for the male of *O. dentatinota*. Bouček (1988) listed the distribution of *Odopoa* as from continents surrounding the Indian Ocean and there have not previously been any records from outside the Oriental, Australasian and Afrotropical regions. Nothing is known of the biology of the species except that *O. philippiae* was reared from flower-galls on *Philippia* sp. (Ericaceae) (Risbec 1952).

During a biodiversity expedition of Hainan Island from 2007 to 2011, individuals of *Odopoa* were found for the first time in China. In this study we describe two new species of *Odopoa* and present the first key to all seven world species.

## Material and methods

Specimens of the newly described species were swept using an insect net and preserved in 75% ethanol. They were subsequently air dried, point-mounted, and examined with a Leica MZ APO stereomicroscope. The holotype of *O. atra* was examined, but type material of the other four described species were not examined. Photographs were obtained using a Nikon Multizoom AZ100 system, and plates of illustrations compiled using Adobe Photoshop software. The line drawing figures (Figs 13–15) were redrawn from the original figures of Bouček (1988) and Sureshan (2007).

Morphological terminology follows that of Bouček (1988), Gibson *et al.* (1997) and Gibson (2009). Body length (i.e. length of body excluding the ovipositor sheaths) is measured in millimeters, but other measurements are relative. Abbreviations of morphological terms used are:  $fu_n$  = funicular segment; POL = posterior ocellar distance; OOL = ocellocular distance;  $Gt_n$  = gastral tergum.

Type specimens of the newly described species are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS). Other cited museums are as follows: BMNH = The Natural History Museum, London, United Kingdom; QMB = Queensland Museum, Brisbane, Australia; MNHN = Muséum National d'Histoire Naturelle, Paris, France; ANIC = Australian National Insect Collection, Canberra, Australia; ZSIO = The Zoological Survey of India, Kolkata, India.

## *Odopoa* Walker, 1871

*Odopoa* Walker, 1871: 36. Type species: *Odopoa atra* Walker, by monotypy. Ashmead, 1904: 245; Bouček, 1978: 130; Bouček, 1988: 148; Narendran, 1994: 26; Grissell, 1995: 102, 224.

*Australtorymus* Girault, 1925: 97. Type species: *Australtorymus dentatinotus* Girault, by monotypy. Synonymized by Bouček, 1988: 148.

*Ua* Girault, 1929: 2. Type species: *Ua maria* Girault, by monotypy. Synonymized by Bouček, 1988: 148.

*Pauliana* Risbec, 1952: 375. Type species: *Pauliana philippiae* Risbec, by monotypy. Synonymized by Bouček, 1978: 130.

**Diagnosis.** Body stout, thorax convex. Head and thorax finely punctured; head as broad as thorax. Antenna stout, clavate. Pronotal collar reticulate, rectangular (Fig. 3), slightly narrower than mesoscutum, and separated from column by slight to distinct cross-edge. Propodeum glabrate with median carina. Hind femur without ventral teeth. Fore wing with postmarginal vein much shorter than marginal vein, as long as or slightly longer than stigmal vein (Figs 9, 13–16). Petiole dark, slender and sculptured, as long as scutellum. Gaster (Figs 1, 6, 10, 12) smooth dorsally and in female short-elliptical, dorsally arched, and slightly compressed; ovipositor at most as long as thorax.

**Biological notes.** Biology unknown except *O. philippiae* reared from flower-galls on *Philippia* sp. (Ericaceae) in Madagascar (Risbec 1952).

**Distribution.** Asia (China (Hainan Island), India, N. Borneo, Philippines, Sri Lanka), Southern Africa and Madagascar, and Australia.

**Remarks.** Girault (1925) established *Australtorymus* in Callimomidae (= Torymidae) and *Ua* in Miscogasteridae (Pteromalidae). Bouček (1988) considered the two genera as junior synonyms of *Odopoa* within Odopoiini (Toryminae), whereas Grissell (1995) classified *Odopoa* in Torymini. *Odopoa* is distinguished from other genera of Torymini by the presence of a long, sculptured, dark petiole, a pronotum with the collar having a slight to distinct cross-edge, the hind femur non-dentate, and a postmarginal vein that is much shorter than the marginal vein.

## Key to species of *Odopoa*

1	Female. ....	2
-	Male. ....	7
2	Fore wing with distinct infumation (Figs 13, 15, 16) ....	3
-	Fore wing without infumation (Figs 9, 14) ....	6
3	Fore wing with two narrow, dark brown, more or less straight cross bands, one each below parastigma and stigmal veins (Fig. 15) ....	4
-	Fore wing with straight dark brown band below parastigma, but band below stigmal vein V-shaped, and sometimes with third infuscate region apically (Figs 13, 16) ....	5

- 4 Head width equal to width of thorax; Gt<sub>1</sub> and Gt<sub>2</sub> with hind margins straight; ovipositor sheaths longer than gaster . . . . . *O. atra* Walker
- Head width 1.13× width of thorax; Gt<sub>1</sub> and Gt<sub>2</sub> with hind margins distinctly incised medially; ovipositor sheaths shorter than gaster . . . . . *O. reticulata* Sureshan
- 5 Fore wing with two brown bands, one straight band below parastigma and one V-shaped band below stigmal vein (Fig. 13); postmarginal vein 2× as long as stigmal vein; Gt<sub>2</sub> with hind margin incised medially; ovipositor sheaths 0.5× as long as gaster . . . . . *O. dentatinota* (Girault)
- Fore wing with three brown bands, including small band apical to V-shaped band (Figs 5, 16); postmarginal vein as long as stigmal vein; Gt<sub>2</sub> with hind margin in shape of an “M”; ovipositor sheaths more than 0.6× as long as gaster . . . . . *O. jianfengica* Xiao et Jiao sp. nov.
- 6 Head in dorsal view 2.3× as wide as long, length of flagellum plus pedicel shorter than width of head; pronotum with anterior margin rounded, hardly edged; Gt<sub>1</sub> and Gt<sub>2</sub> with hind margins straight; ovipositor sheaths shortly exerted (Bouček 1988, fig. 218) . . . . . *O. josephinae* Bouček
- Head in dorsal view 2× as wide as long; length of flagellum plus pedicel equal to width of head; pronotum with anterior margin straight, distinctly edged (Fig. 8); Gt<sub>1</sub> with hind margin U-shaped and Gt<sub>2</sub> incised medially (Fig. 10); ovipositor sheaths distinctly protruded, 0.8× as long as gaster . . . . . *O. wenchangica* Xiao et Hu sp. nov.
- 7 Fore wing with parastigma and stigma darkened. . . . . *O. dentatinota* (Girault)
- Fore wing whitish, without infumation. . . . . .8
- 8 Gastral petiole longer than scutellum; anterior margin of pronotum edged (Fig. 12); Gt<sub>2</sub> with hind margin protruded in U-shape medially; body with head and mesosoma bluish green and gaster black. . . . . *O. wenchangica* Xiao et Hu sp. nov.
- Gastral petiole almost as long as scutellum; anterior margin of pronotum rounded, hardly edged; Gt<sub>2</sub> with hind margin straight, not protruded in U-shape medially; body black . . . . . .9
- 9 Head 2.3× as wide as long; pronotum finely raised-reticulate; gaster dorsally convex; Gt<sub>1</sub> and Gt<sub>2</sub> long; body black with bright metallic gloss. . . . . *O. josephinae* Bouček
- Head 2.0× as wide as long; propodeum rugose; gaster dorsally flat; Gt<sub>2</sub> and Gt<sub>3</sub> long; body dark with blue gloss . . . . . *O. philippiae* (Risbec)

***Odopoa jianfengica* Xiao et Jiao sp. nov.**

(Figs 1–5, 16)

**Type material.** HOLOTYPE (♀, IZCAS). CHINA: Hainan: Ledong, Mt. Jianfeng, 828 m, 20.V.2009, coll. Tingyu Hu.

**Etymology.** The specific name is from the name of the type locality, Mt. Jianfeng of Hainan Province.

**Description.** FEMALE. Length = 2.4 mm. Body (Fig. 1) dark green except gaster and ovipositor sheaths black-brown. Mandible brownish yellow; eye pale pink, ocelli transparent. Antenna dark brown except scape brownish yellow. Wings hyaline, fore wing with dark brown below parastigma, V-shaped band below stigmal vein, and an additional band apically (Figs 5, 16). Legs with coxae concolorous with mesosoma; fore and mid femora and tibiae yellowish brown; hind femur, tibia and all claws dark brown. Ovipositor sheaths black-brown, ovipositor brownish yellow.

Head in dorsal view 1.8× as wide as long, vertex with fine transverse reticulation on posterior margin; anterior and posterior ocelli almost in same line, the posterior ocelli near occipital carina (Figs 3, 4); POL 2.4× OOL; temple 0.4× as long as eye length; occipital carina fine, reaching vertex. Head in anterior view about 1.1× as high as wide; upper face with shallowly engraved reticulation (Fig. 2); lower face with finely raised reticulation; scrobe distinct. Ventral margin of clypeus truncate; anterior tentorial pits indistinct, vertical suture between each pit and margin of mouth distinct; eye height 3.1× eye width and about 2.5× malar space; inner margin of eyes parallel; mandible tridentate. Antenna (Fig. 2) distinctly clavate, inserted at center of face; scape 0.8× as long as eye height, at most reaching anterior ocellus; combined length of pedicel and flagellum slightly greater than head width (at most 1.1×); anellus ring-like; funicle with fu<sub>1</sub> shortest, transverse, about 0.5× as long as fu<sub>2</sub>, subsequent segments subquadrate to slightly transverse, and each funicular segment bearing one row of longitudinal sensilla; clava 1.9× as long as its greatest width and slightly longer than fu<sub>5</sub>–fu<sub>7</sub>, combined.

Mesosoma convex in lateral view (Fig. 1), as broad as or slightly narrower than head width. Pronotum with raised reticulation, pronotal collar 3.5× as wide as long, distinctly narrower than mesoscutum, with anterior edge of collar not carinate but sharply edged and distinctly emarginate medially (Figs 3, 4). Mesoscutum with raised reticulation; notauli complete and distinct (Fig. 4). Scutellum smooth, longer than wide; frenal line distinct in posterior 1/3 of scutellum. Propodeum rugose, median carina complete and distinct, and with several irregular longitudinal

carinulae on either side; costula distinct and convex on lateral part of propodeum; spiracles almost touching hind margin of metanotum. Mesopleuron with mesepisternum reticulate; upper and lower mesepimeron smooth; transepimeral sulcus reduced to a single pit. Metapleuron smooth. Fore wing 2.5× as long as wide (Figs 5, 16); costal cell bare on upper surface and with three setae on ventral surface; basal cell and basal fold bare; subcubital setal line distinctly setose from speculum to apical margin of wing; marginal vein 11× as long as postmarginal vein; postmarginal vein very short, as long as stigmal vein. Hind coxa reticulate; hind femur slender, without ventral teeth (Fig. 1); hind tibia with two short spurs; basitarsus 0.3× as long as hind tibia.

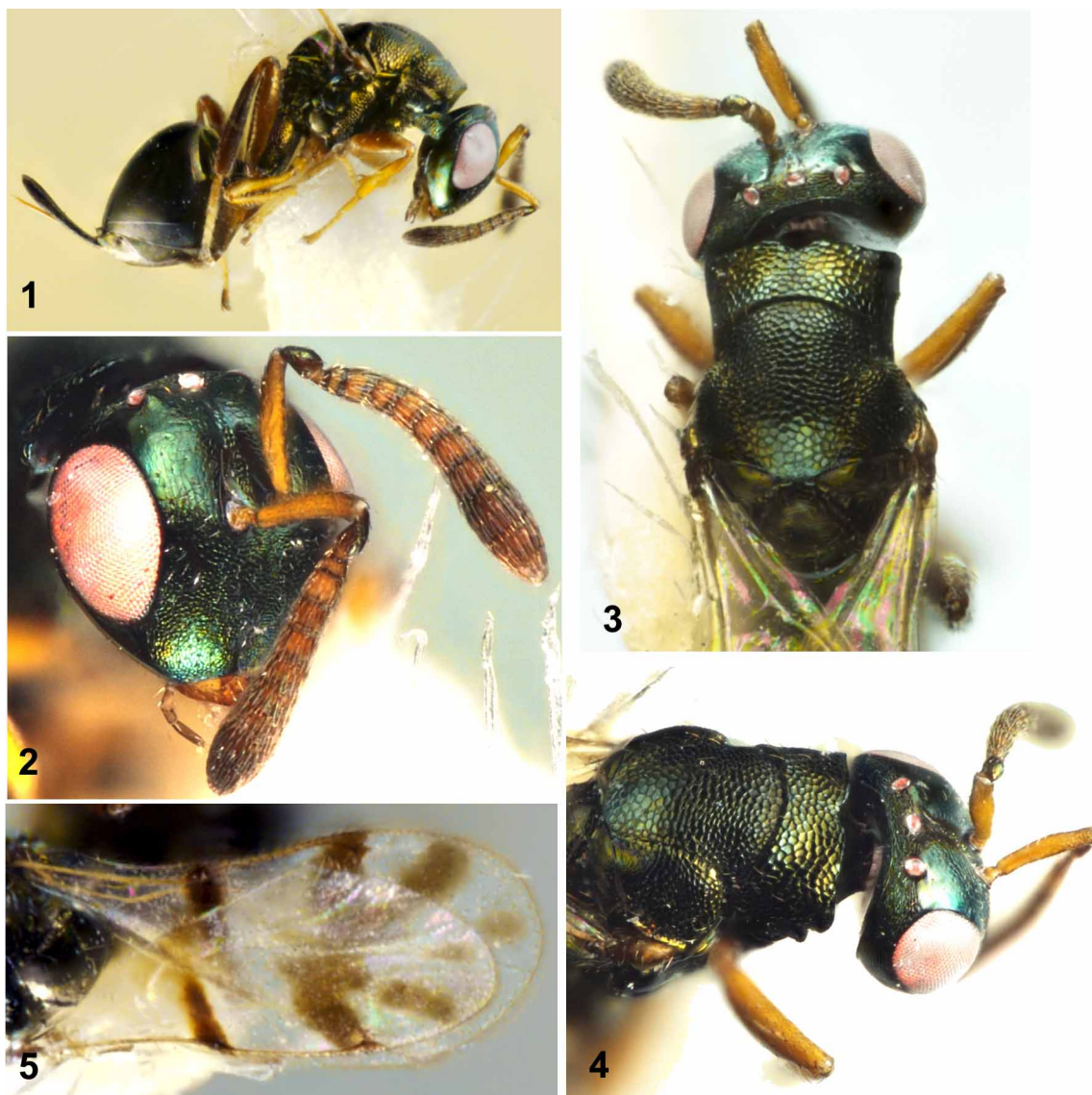
Metasoma slightly shorter than mesosoma. Petiole reticulate and rugose on anterior half, petiole as long as hind coxa. Gaster arched (Fig. 1) in lateral view; dorsally smooth, 1.5× as long as wide; Gt<sub>1</sub> with hind margin incised medially; Gt<sub>2</sub> with hind margin M-shaped; Gt<sub>3</sub> longest, about 0.7× as long as gaster; ovipositor sheaths 0.6× as long as gaster.

MALE. Unknown.

**Distribution.** China (Hainan).

**Biology.** The new species was swept on grassy place, the host is unknown.

**Remarks.** This new species resembles *O. dentatinota*, but is distinguished from the later by the features given in the key.



**FIGURES 1–5.** *Odopoa jianfengica* Xiao et Jiao **sp. nov.** 1. Body lateral, female. 2. Head and antennae frontolateral, female. 3. Head and thorax dorsal, female. 4. Head and thorax dorsolateral, female. 5. Fore wing dorsal, female.

***Odopoa wenchangica* Xiao et Hu sp. nov.**

(Figs 6–12)

**Type material.** HOLOTYPE (♀, IZCAS). CHINA: Hainan: Wenchang, Touyuan Village, 24.V.2009, coll. Tingyu Hu.

PARATYPES (9♀ 8♂, IZCAS). Same data as holotype.

**Etymology.** The specific name is from the name of the type locality, Wenchang of Hainan Province.

**Description.** FEMALE. Length = 2.8 mm. Head except vertex green with bright metallic gloss, vertex with purple tint. Mandible brownish yellow; eye pink, ocelli transparent. Antenna with scape yellow, pedicel and anellus brown, all funicular segments and clava dark brown. Mesosoma green with bronze gloss except propodeum with purple gloss. Wings hyaline, veins pale brown. Legs with fore and mid coxae yellow; hind coxa concolorous with mesosoma; all femora, tibiae and claws yellowish brown. Metasoma black-brown except petiole and ovipositor brownish yellow.

Head in dorsal view 2× as wide as long, vertex smooth except posterior margin with transverse reticulation; temple 0.6× eye length; POL 1.9× OOL; occipital carina fine, reaching vertex; posterior ocelli near occipital carina, about 0.5× length of their own diameter. Head in anterior view 1.3× as high as wide (Fig. 7); upper face with engraved reticulation; lower face with dense, raised reticulation; scrobe distinct. Ventral margin of clypeus slightly protruded; tentorial pits distinct and vertical suture between pit and the margin of mouth distinct but shallow; eye height 3.1× eye width and about 4.3× malar space; inner margins of eyes slightly convergent to clypeus (Fig. 7); mandible tridentate. Antenna (Fig. 7) clavate, inserted at center of face; scape 0.7× as long as eye height, at most reaching ventral margin of anterior ocellus; combined length of pedicel and flagellum equal to head width; anellus subquadrate; funicle with  $fu_1$  quadrate, 0.5× as long as  $fu_2$ ,  $fu_2$  1.1–1.2× as long as its greatest width,  $fu_3$  and  $fu_4$  quadrate,  $fu_5$ – $fu_7$  subquadrate, and each funicular segments bearing one row of longitudinal sensilla; clava slightly longer than  $fu_6$  and  $fu_7$  combined.

Mesosoma convex in lateral view (Fig. 6), slightly narrower than head. Pronotum with raised reticulation, pronotal collar rectangular in dorsal view, distinctly narrower than mesoscutum, and with anterior edge sharply margined (Fig. 8). Mesoscutum with raised reticulation; notauli distinct and complete. Scutellum with engraved reticulation except for frenum, almost as wide as long and distinctly convex in anterior 1/3 (Fig. 6); frenal line with a row of coarse punctures. Propodeum smooth, median carina distinct, with several longitudinal carinulae basally. Fore wing (Fig. 9) 2.4× as long as wide; costal cell bare; basal area, disc and speculum bare; subcubital setal line with sparse setae from speculum to apical margin of wing; marginal vein 8.3× as long as postmarginal vein; postmarginal vein and stigmal vein very short, postmarginal vein 1.5× as long as stigmal vein. Hind coxa reticulate, dorsal surface with a longitudinal carina; hind femur without ventral teeth, 4.5× as long as wide; hind tibia with two short spurs; basitarsus 0.3× as long as hind tibia.

Metasoma as long as mesosoma. Petiole 0.8× as long as hind coxa, laterally carinate and with distinct median carina. Gaster arched (Figs 6, 10) in lateral view; dorsally smooth, 1.5× as long as wide;  $Gt_1$  with hind margin protruded into U shape;  $Gt_2$  with hind margin strongly incised medially (Fig. 10);  $Gt_3$  longest,  $Gt_3$  and  $Gt_4$  combined about 0.7× length of gaster; ovipositor sheath distinctly protruded, 0.8× as long as gaster.

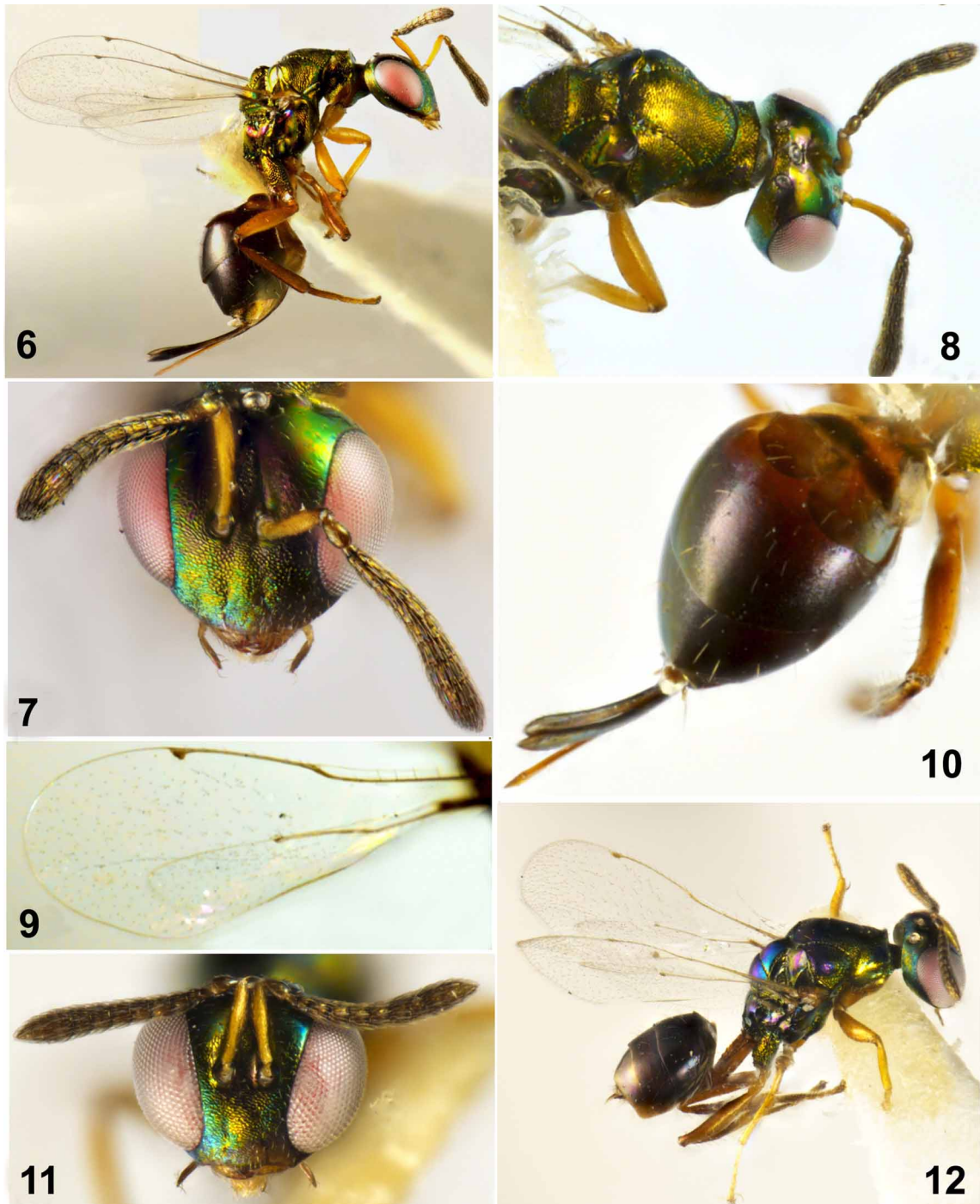
MALE. Length = 2.3 mm. Head and thorax bluish green, gaster dark brown; antenna black-brown except scape yellow; eye pale pink. Eye height 7.8× malar space; inner margins of eyes strongly convergent to clypeus (Fig. 11). Head in dorsal view 2.2× as wide as long, temples about half length of eye. Antenna with scape at most reaching anterior ocellus, as long as head width. Pronotum narrower than mesoscutum. Scutellum oval, strongly convex and smooth, with frenal line distinct. Propodeum smooth, median carina complete. Petiole longer than scutellum, 1.8× as long as hind coxa (Fig. 12). Gaster 1.2× as long as wide, as broad as mesoscutum, shorter than mesosoma;  $Gt_1$  with hind margin protruded into U shape medially;  $Gt_2$ – $Gt_5$  with hind margins truncate;  $Gt_3$ – $Gt_5$  of equal length.

**Distribution.** China (Hainan).

**Biology.** All the specimens were swept around a big flowering tree (probably Ericaceae) in Touyuan Village of Wenchang, Hainan Province.

**Remarks.** Females of *O. wenchangica* are similar to those of *O. josephinae* in having hyaline fore wings, but they differ by the features given in the key. Males of the new species are similar to *O. philippiae*, but are differentiated by those features given in the key.





**FIGURES 6–12.** *Odopoa wenchangica* Xiao et Hu **sp. nov.** 6. Body lateral, female. 7. Head and antennae frontal, female. 8. Head and thorax dorsolateral, female. 9. Fore wing dorsal, female. 10. Gaster dorsolateral, female. 11. Head and antennae frontal, male. 12. Body dorsolateral, male.

### Checklist of species

#### *Odopoa atra* Walker, 1871

*Odopoa atra* Walker, 1871: 36. Lectotype ♀, [Sri Lanka] (BMNH, examined, B.M. TYPE HYM 5.0162).

**Remarks.** Walker (1871) described the fore wings of *O. atra* as having a brown middle band, but Bouček (1978)

discovered the single type specimen in the BMNH, which he selected as lectotype, and found that the fore wings bear two short cross-fasciae. Because of this females of *O. atra* are most similar to those of *O. reticulata*.

**Distribution.** Sri Lanka.

### *Odopoia dentatinota* (Girault, 1925)

(Fig. 13)

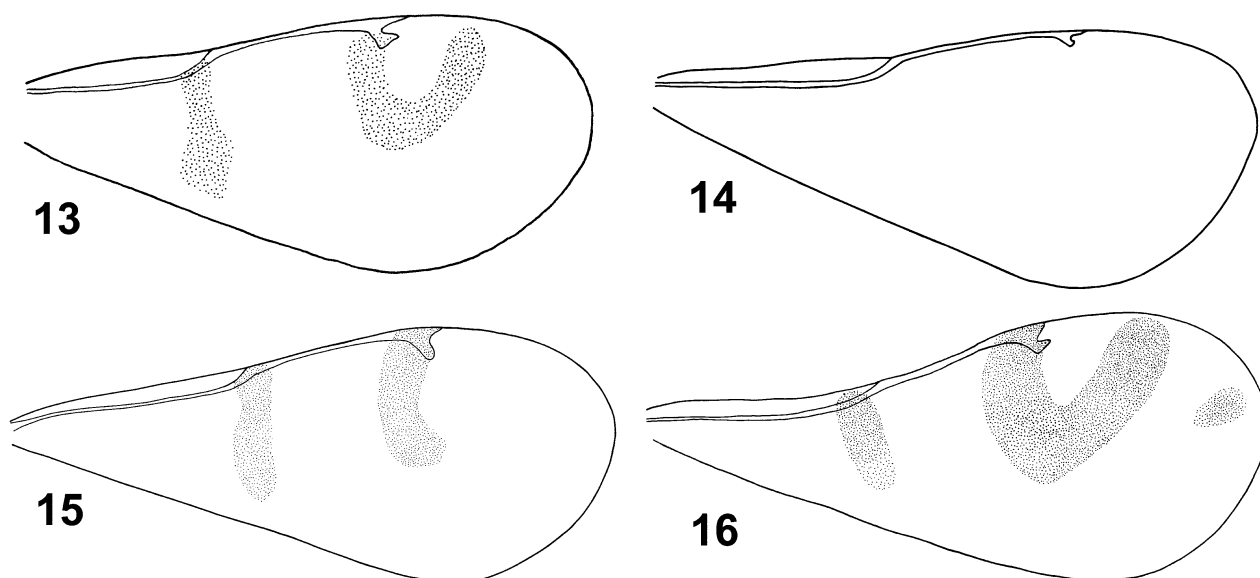
*Australtorymus dentatinotus* Girault, 1925: 97–98. Holotype ♀, [Queensland]: Cedar Creek (QMB) (not examined).

*Odopoia dentatinota* (Girault): Bouček, 1988: 148.

*Ua maria* Girault, 1929: 2. Holotype ♀, [Queensland]: Gold Creek (QMB). Synonymized by Bouček, 1988: 148.

**Remarks.** Based on the description of Girault (1925), females of *O. dentatinota* most closely resemble those of *O. jianfengica* because both have two infuscate bands that form a “IV” pattern. Unlike *O. jianfengica*, females of *O. dentatinota* lack a third, apical infuscate region. According to Bouček (1988) males of *O. dentatinota* only have the parastigma and stigma darkened.

**Distribution.** Australia.



**FIGURES 13–16.** Fore wing of *Odopoia* species, female. 13, *O. dentatinota* (from Bouček, 1988); 14, *O. josephinae* (from Bouček, 1988); 15, *O. reticulata* (from Sureshan, 2007); 16, *O. jianfengica* Xiao et Jiao **sp. nov.**

### *Odopoia philippiae* (Risbec, 1952)

*Pauliana philippiae* Risbec, 1952: 375–378. Holotype ♂, [Madagascar] (MNHN) (not examined).

*Odopoia philippiae* (Risbec): Bouček, 1978: 130.

**Remarks.** This species was based only on males by Risbec (1952). Based on the original description, males are most similar to those of *O. wenchangica* because both have hyaline fore wings.

**Distribution.** Madagascar.

### ***Odopoa josephinae* Bouček, 1988**

(Fig. 14)

*Odopoa josephinae* Bouček, 1988: 148. Holotype ♀, [Australia]: Northern Territory (ANIC) (not examined).

**Remarks.** Bouček (1988) described *O. josephinae* from both sexes. Although not stated explicitly, the description implies that males have a very similar fore wing pattern to females, that is, without infumation.

**Distribution.** Australia.

### ***Odopoa reticulata* Sureshan, 2007**

(Fig. 15)

*Odopoa reticulata* Sureshan, 2007: 2788. Holotype ♀, [India]: Orissa (ZSIO) (not examined).

**Remarks.** Females of *O. reticulata* are most similar to *O. atra* because both have only two narrow cross bands on the fore wing (Fig. 15).

**Distribution.** India.

### **Acknowledgments**

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