



Revision of the bee genus *Bathanthidium* Mavromoustakis (Hymenoptera: Apoidea: Megachilidae: Anthidiini) with description of a new species from China

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Abstract

This revision of the bee genus *Bathanthidium* Mavromoustakis, 1953, treats 12 species, with 11 recorded from China, including *Bathanthidium fengkaiense* Niu & Zhu, **sp. nov.** Two species are proposed as new combinations in genus *Bathanthidium*: *Anthidium* (s. str.) *bicolor* Wu, 2004, *A.* (s. str.) *monganshanensis* Wu, 2004. The two new combinations (*B. bicolor*; *B. monganshanense*) are in *Bathanthidium* (*Manthidium*), previously considered to include only the type species from Burma and Laos (published records from northeastern India and Malaysia are based on misinterpreted localities). *Trachusa* (*Paraanthidium*) *concovum* (Wu, 1962) and *Stelis siamensis* Friese, 1925 are synonymized with *B. binghami* (Friese, 1901). *Bathanthidium circinatum* Wu, 2004 is transferred to *Pseudoanthidium* Friese forming the new combination *P.* (s. str.) *circinatum* (Wu, 2004). The distribution of each species is given, new distribution sites are marked by asterisk (*) especially. Our results confirm that the genus *Bathanthidium* has higher species diversity than previously documented and that this diversity is centered in China.

Key words: Apiformes, description, illustration, fauna, taxonomy

Introduction

Bathanthidium Mavromoustakis, 1953, was erected as a subgenus of *Dianthidium* Cockerell, 1900, at a time when that genus was interpreted broadly to include Old World taxa (as now recognized it is exclusively found in the New World). Pasteels (1968) elevated *Bathanthidium* to generic rank. Michener & Griswold (1994) treated it in their review of Old World taxa of tribe Anthidiini and divided it into three subgenera (both additional subgenera authored by Pasteels, 1968, 1969). Michener (2000, 2007) included *Bathanthidium* in his series A, one of two informal groups of Anthidiini that includes the majority of genera of the tribe. Series A was characterized by mandibles of the females having three or four teeth (rarely more) joined by shallow or at least rounded concavities, whereas Series B, which includes the well-known wool-carder bees in Anthidiini, has more numerous (5–18), usually sharp teeth separated by acute notches. According to Michener (2007), bees of the genus *Bathanthidium* are small to moderate-sized, with the body all black or black with yellow integumental markings, with the yellow metasomal bands medially interrupted on anterior terga; epistomal suture generally straight; preoccipital ridge not carinate; omaral carina absent or extending down only to middle of mesepisternum; pronotal lobe with carina weak or absent; scutellum rounded or medially emarginate, in profile rounded or at least not sharp and not overhanging metanotum; propodeum with a fovea behind the spiracle; 2nd m-cu slightly exceeding the apical margin of 2nd submarginal cell; arolia present; S4 and S5 of the male with median pectinate hairs; T7 of the male ranging from simple to trilobed, with the median lobe longest; front coxae of the male normal, lacking spines.

Michener (2000, 2007) recorded only a total of four species in the three subgenera of *Bathanthidium*, and noted taxonomic uncertainties about a fourth named taxon, *Lasanthidium* Romankova, which he recorded as a questionable junior synonym of *Bathanthidium* (*Stenanthidiellum*) (the only subgenus with more than one species, when including the poorly known type species of *Lasanthidium*, *Stelis malaisei* Popov, 1951). Wu (2006) recorded two subgenera from China, *Bathanthidium* and *Stenanthidiellum*, and five species and provided a key to these. Niu *et al.* (2012) described a new species of subgenus *Bathanthidium* from Hainan, presented a key to the eight species recorded from China, and noted this country as the center of distribution for the genus.

In general, *Bathanthidium* has been little-known in part because of its Asiatic distribution with little material available at the time of historical treatments. To this day, most specimens reside in Chinese and Russian collections. Popov (1941) contributed to uncertainty about taxa in this group by describing *B. malaisei*, in the genus *Stelis*, which consists exclusively of cleptoparasites whereas *Bathanthidium* are pollen-collecting bees.

Based on recently collected specimens, examination of specimens from the Insect Collection of the Institute of Zoology, Chinese Academy of Sciences (IZCAS), including holotypes of all 7 species described by Wu, and a review of published information, we recognize 12 species of the genus *Bathanthidium*, including one new species and two new combinations (Table 1).

TABLE 1. Summary of species currently included in *Bathanthidium*, including species treated in this study, with information on the known sexes and distribution. Sex: ♂ = male; ♀ = female. The symbol * represent new distribution.

Species	Sexes known	Distribution
<i>B. (Bathanthidium) bifoveolatum</i> (Alfken, 1937)	♀, ♂	China (Shaanxi*, Henan*, Jiangxi*, Zhejiang, Anhui, Fujian, Hubei, Hunan, Guangxi, Guizhou, Sichuan*, Chongqing*, Yunnan, Taiwan).
<i>B. (Bathanthidium) fengkaiense</i> Niu & Zhu, sp. nov.	♀	China (Guangdong).
<i>B. (Bathanthidium) hainanense</i> Niu, Wu & Zhu, 2012	♀	China (Hainan).
<i>B. (Manthidium) atriceps</i> (Morawitz, 1890)	♀, ♂	China (Shaanxi*, Zhejiang*, Fujian, Gansu, Xizang*)
<i>B. (Manthidium) barkamense</i> (Wu, 1986)	♀, ♂	China (Sichuan).
<i>B. (Manthidium) bicolor</i> (Wu, 2004), comb. nov.	♂	China (Sichuan).
<i>B. (Manthidium) binghami</i> (Friese, 1901)	♀, ♂	Burma, Laos, Thailand, NE India, Sikkim, China (Yunnan).
<i>B. (Manthidium) moganshanense</i> (Wu, 2004), comb. nov.	♂	China (Zhejiang).
<i>Bathanthidium (Stenanthidiellum) emeiense</i> Wu, 2004	♀	China (Sichuan).
<i>B. (Stenanthidiellum) malaisei</i> (Popov, 1941)	♀, ♂	South Korea.
<i>B. (Stenanthidiellum) rubopunctatum</i> (Wu, 1993)	♀, ♂	China (Yunnan Sichuan).
<i>B. (Stenanthidiellum) sibiricum</i> (Eversmann, 1852)	♀, ♂	China (Beijing, Hebei, Neimenggu, Heilongjiang, Jilin, Zhejiang, Hubei*, Guangdong, Sichuan, Yunnan, Xizang*), South Korea, Russia.

Material and methods

Most specimens examined, including the holotypes of all species described from China by Yan-Ru Wu and the types of the new species described in this paper, are deposited in the Insect Collection of the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS). The specimens were examined with a Nikon SMZ 1500 stereomicroscope. Attributes were recorded with a Nikon D7000 digital camera. Final images represent a composite of several photographs taken at different focal planes and combined using the program Helicon Focus 6. All images were post-processed for contrast and brightness using Adobe® Photoshop®. The morphological terminology used in the descriptions follows Michener (2000). Absolute measurements, in millimeters (mm), are used for length of body. For all other structures, relative measurements are used. Abbreviations used in the description are as follows: BL (body length): measured from the base of the antennal socket to the apex of the metasoma; HL (head length): measured from the apicomedian margin of the clypeus to the upper margin of the vertex in frontal view; HW (head

width): measured at the widest point of the head across the compound eyes in frontal view; EW (eye width): the greatest width of eye in lateral view; GW (genal width): the greatest width of the gena in lateral view. Abbreviations T and S respectively denote terga and sterna.

Results

Bathanthidium Mavromoustakis, 1953

Bathanthidium (*Bathanthidium*): *Dianthidium* (*Bathanthidium*) Mavromoustakis, 1953: 837. Type species: *Dianthidium bifoveolatum* Alfken, 1937, by original designation.

Bathanthidium (*Manthidium*): *Manthidium* Pasteels, 1969: 43. Type species: *Anthidium binghami* Friese, 1901, by original designation.

Bathanthidium (*Stenanthidiellum*): *Bathanthidium* (*Stenanthidiellum*) Pasteels, 1968: 1059. Type species: *Anthidium sibiricum* Eversmann, 1852, by original designation.

Key to the known species of *Bathanthidium*

(Females of *B. bicolor*, *B. monganshanense*, males of *B. fengkaiense*, *B. hainanense*, *B. emeiense* unknown, not be included in the key)

1	Flagellum 10-segmented, female	2
-	Flagellum 11-segmented, male	11
2	Fovea behind propodeal spiracle rounded, delimited by strong carina	3 <i>B. (Bathanthidium</i> s. str.)
-	Fovea behind propodeal spiracle elongate, weakly delimited	5
3	Paraocular area with thin and long yellow marking extending along the inner margin to the top of the eye	
-	Paraocular area near ventral extreme with a small sub-triangle or sub-rectangle dull yellow marking	4
4	T1–T2 black, without yellow marking, T3–T5 with broader yellow bands, the band on T3 obviously interrupted medially; paraocular area yellow marking sub-rectangle; the lowest tooth on mandible acute	
-	T1 black, T2 medially with a pair of small, stripe-like yellow markings, T3–T5 with broader yellow bands, the bands on T3–T5 entire, not interrupted medially; the lowest tooth on mandible slightly rounded	
5	Basal zone of propodeum not distinct, with irregular, sculptured, sloping pits laterally	6 <i>B. (Manthidium)</i>
-	Basal zone of propodeum distinct laterally, with regular, shiny, nearly horizontal pits	8 <i>B. (Stenanthidiellum)</i>
6	T6 yellow or with yellow fasciae basally; paraocular area black or with thin and long yellow marking	7
-	T6 black; paraocular area near ventral extreme with dull yellow marking or black	
7	T6 with yellow fasciae basally; paraocular area with thin and long yellow marking extending along the inner margin nearly to the top of the eye	
-	T6 yellow; paraocular area black, without yellow marking	
8	Scutellum with two broad yellow markings apically	<i>B. (Stenanthidiellum) emeiense</i> Wu, 2004
-	Scutellum black	9
9	Metasomal terga dull, not shiny; mandible with four teeth	<i>B. (Stenanthidiellum) malaisei</i> (Popov, 1941)
-	Metasomal terga shiny; mandible with two or three teeth	10
10	Mandible with two teeth; paraocular area near ventral extreme with small yellow marking	
-	Mandible with three teeth, 3 rd tooth more than 2x as far from dorsal tooth as from 2 nd tooth; paraocular area black, without yellow marking	
11	Fovea behind propodeal spiracle rounded, delimited by strong carina; T7 trilobed, median lobe longest and broad, lateral lobe short and acute; paraocular area with thin and long yellow marking extending along the inner margin to the top of the eye	
-	Fovea behind propodeal spiracle elongate, weakly delimited; T7 simple or with slightly produced median lobe (T7 of <i>B. malaisei</i> otherwise); paraocular area black or with different shape yellow marking	12
12	Basal zone of propodeum not distinct, with irregular, sculptured, sloping pits laterally	13 <i>B. (Manthidium)</i>
-	Basal zone of propodeum distinct laterally, with regular, shiny, nearly horizontal pits	17 <i>B. (Stenanthidiellum)</i>
13	Paraocular area yellow marking thin and long, extending along the inner margin to the top or middle of the eye	14
-	Paraocular area yellow marking broad and short, only extending to the low margin of antennal socket	15
14	Mandible with two teeth; paraocular area yellow marking extending nearly to the top of the eye	
-	Mandible with three teeth; paraocular area yellow marking extending nearly to the top of the eye	

- Mandible with three teeth; paraocular area yellow marking extending to the middle of the eye *B. (Manthidium) bicolor* (Wu, 2004)
- 15 T6 with yellow marking medially *B. (Manthidium) binghami* (Friese, 1901)
- T6 black 16
- 16 Clypeus and with shallow and sparse punctures; apicomedian margin of clypeus nearly straight *B. (Manthidium) atriceps* (Morawitz, 1890)
- Clypeus with deep and dense punctures; apicomedian margin of clypeus strongly extend *B. (Manthidium) moganshanense* (Wu, 2004)
- 17 Paraocular area yellow marking thin and long, extending along the inner margin to the top or middle of the eye; T7 trilobed, the median lobe long and broad, lateral lobe small and acute *B. (Stenanthidiellum) malaisei* (Popov, 1941)
- Paraocular area yellow marking broad and short, only extending to the low margin of antennal socket; T7 medially slightly produced or truncated 18
- 18 T7 medial projection triangular point with lateral shoulders *B. (Stenanthidiellum) rubopunctatum* (Wu, 1993)
- T7 simple, truncated apically *B. (Stenanthidiellum) sibiricum* (Eversmann, 1852)

Species Accounts

Bathanthidium (Bathanthidium) bifoveolatum (Alfken, 1937)

(Figs see Niu, *et al.*, 2012: Figs 29–41)

Anthidium bifoveolatum Alfken, 1937: 405, ♀, ♂. Type locality: Fukien (China, Fujian), not examined.

Dianthidium (Bathanthidium) bifoveolatum (Alfken): Mavromoustakis, 1953: 838, ♀, ♂ (redescription).

Dianthidium bifoveolatum (Alfken): Wu, 1993: 1399.

Bathanthidium (s. str.) *bifoveolatum* (Alfken, 1937): Wu, 2006: 128, ♀, ♂ (key), 129, ♀, ♂ (redescription), Fig. 62 a–f; Niu, *et al.*, 2012: 61, ♀, ♂ (key), Figs. 29–41.

Material examined: China, Shaanxi: Ningshan Xian, Huoditang (33°26'N, 108°27'E), 1 ♀, 1580 m, 27.VII.1998, leg. De-Cheng YUAN, 1 ♀, 1600–1700 m, 28.VII.1998, leg. Xue-Zhong ZHANG; Henan: Xin Xian (31°30'N, 114°48'E), 1 ♀, 18.VII.1999, leg. Yong-Shan SHI; Jiangxi: Jiulianshan (24°30'N, 114°30'E), 1 ♀, 20.IX.1979, leg. Pei-Yu YU; Zhejiang: Tianmu Shan (25°30'N, 109°54'E), 3 ♀, 25.VIII.1947, 3 ♀, 28.VIII.1947, 7 ♀, 13–16.IX.1947, 4 ♂, 13–15.IX.1947, leg. no information on label; 1 ♀, 23.VI.1936, 1 ♀, 23.VII.1936, leg. O. Piel; 1 ♂, 400–500 m, 18.IX.1995, leg. Huan-Li XU; Anhui: Huangshan (30°12'N, 118°06'E), 1 ♀, 23.VI.1936, 1 ♂, 25.VIII.1936, leg. no information on label; Huoshan, Majiahe (36°24'N, 116°18'E), 800 m, 1 ♀, 1.IX.1978, leg. Shu-Yong WANG; Hubei: Lichuan, Xingdoushan (29°57'N, 108°57'E), 1 ♂, 800 m, 24.VII.1974, leg. Long-Long YANG; Shennongjia, Guanmenshan (31°12'N, 112°24'E), 1 ♀, 1720 m, 30.VII.1998, leg. Chan-Juan YE; Hunan: Suoxiyu (29°16'N, 110°20'E), 1 ♀, 19.X.1988, leg. Xing-Wang TONG; Cili (29°24'N, 111°06'E), 1 ♂, 3.IX.1988, leg. no information on label; Dayong, Zhushitou (29°06'N, 110°24'E), 2 ♂, 350 m, 19.VIII.1988, leg. Long-Long YANG; Changsha (28°12'N, 112°54'E), 1 ♂, 2 ♀, 1980, leg. no information on label; Guangxi: Longsheng (25°42'N, 111°00'E), 1 ♂, 840 m, 6.VI.1963, leg. Shu-Yong WANG; Baiyan (22°51'N, 118°00'E), 1 ♂, 1150 m, 21.VI.1963, leg. Yong-Shan SHI; Jinx- iu (24°06'N, 110°06'E), 1 ♂, 600 m, 20.V.1999, leg. Ming-Yuan GAO; Fujian: Chong'an (27°42'N, 108°15'E), 1 ♀, 850–1170 m, 20.VIII.1960, leg. Yi-Ran ZHANG; Wuyishan (26°24'N, 116°24'E), 6 ♂, 800–1200 m, 24.VIII.2000, 1 ♂, 2 ♀, 800–1200 m, 26.VIII.2000, leg. Hai-Rong HUANG; Jiangle Xian, Longqishan (26°43'N, 117°24'E), 1 ♂, 1000 m, 12.IX.1990, leg. Lei-Yuan SUN, 1 ♂, 1500 m, 13.IX.1990, leg. Huan-Li XU; Guizhou: Leishan, Tao- jiang (26°12'N, 108°06'E), 1 ♀, 1500–1700 m, 30.VI.1988, leg. De-Cheng YUAN; Sichuan: Luzhou City, Xuyong County, Shuiwei Town, Xixi Village (28°13'N, 105°34'E), 2 ♀, 27.VIII.2013, leg. Feng YUAN; Chongqing: Jiangjin District, Simianshan Town, Hongdong Village (28°35'N, 106°22'E), 4 ♀, 1 ♂, 940–990 m, 14.VIII.2017, leg. Feng YUAN; Yunnan: Weixi (27°06'N, 99°12'E), 1 ♂, 2500 m, 25.VII.1981, leg. Xue-Zhong ZHANG.

Floral association: no record.

General distribution: China (Shaanxi*, Henan*, Jiangxi*, Zhejiang, Anhui, Hubei, Hunan, Guangxi, Fujian, Guizhou, Yunnan, Sichuan*, Chongqing*, Taiwan).

Bathanthidium (Bathanthidium) fengkaiense Niu & Zhu, sp. nov.

(Fig. 1a–f, 2a–f)

Diagnosis: The new species belongs to *Bathanthidium* s. str. based on having fovea behind propodeal spiracle rounded and delimited by strong carina. It is very similar to *B. hainanense* Niu *et al.*, 2012, but the pattern of yellow markings on metasomal terga (Fig. 2d) is different from that of *B. hainanense*, T1–T2 of the new species black, without yellow marking, T3–T5 with broader yellow bands, and the band on T3 obviously interrupted medially (*B. hainanense* T2 medially with a pair of small, stripe-like yellow markings, and bands on T3–T5 entire); mandible with four teeth, and the lowest tooth acute and obviously longer than others (*B. hainanense* although with four teeth on mandible, but the lowest tooth slightly rounded).

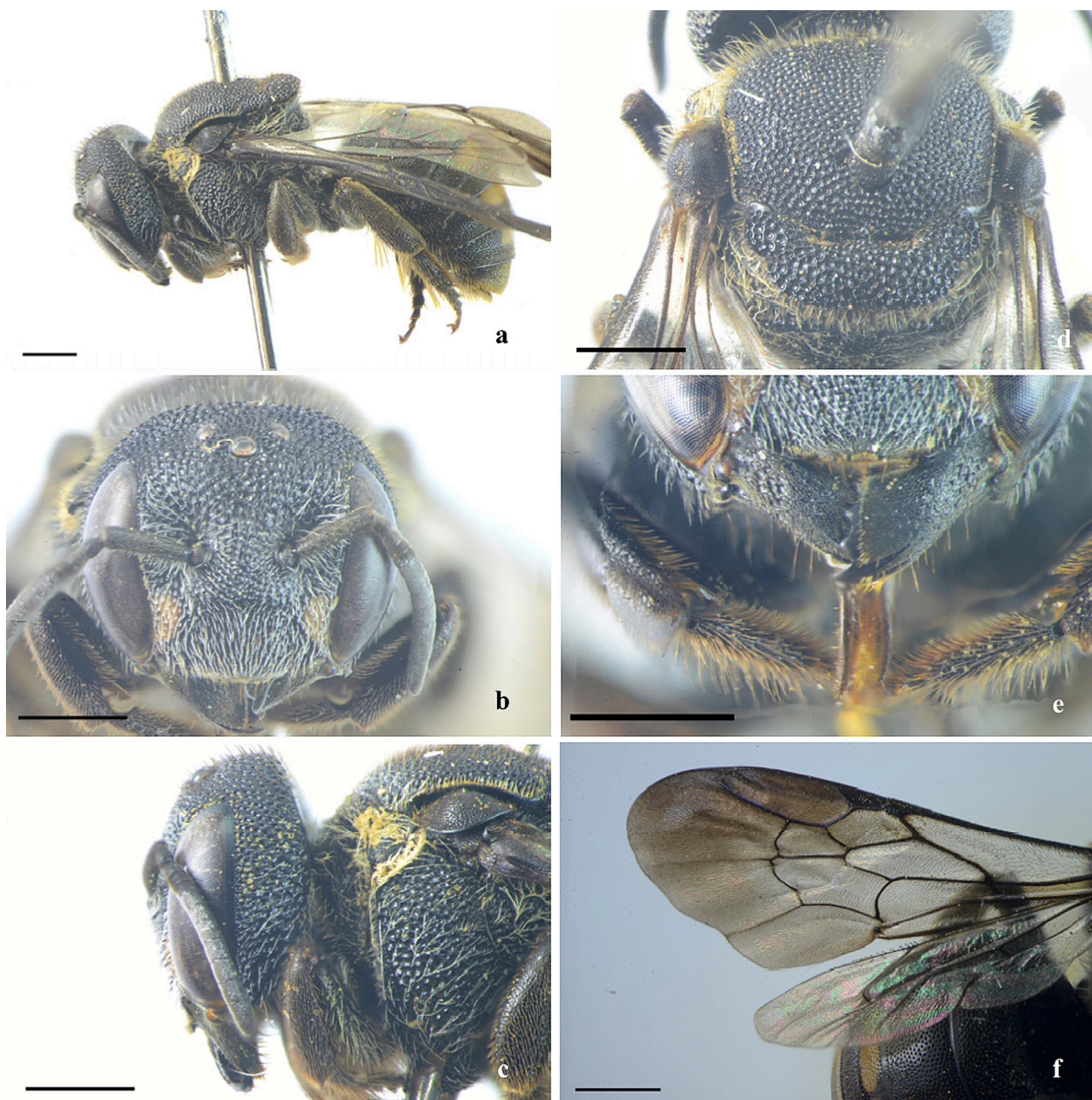


FIGURE 1. *Bathanthidium (Bathanthidium) fengkaiense* Niu & Zhu, sp. nov., female. a: Body in lateral view; b: Head in frontal view; c: Head in lateral view; d: Mesonotum in dorsal view; e: Mandible in frontal view; f: Wings in frontal view. Scale bars: 1mm.

Description: Female, BL=7.5 mm (Fig. 1a); head broader than long, HW: HL=55: 47 (Fig. 1b); gena narrower than eye, GW: EW=12: 15 (Fig. 1c); width of metasoma nearly as broad as the width between the tegulae. Clypeus broader than long, with round small and dense punctures; vertex, frons and gena with round large and dense punctures; mesoscutum and scutellum with round, dense punctures, size of punctures as same as that on vertex; T1–T5 with round, small and dense punctures; mandible widened apically, with 4 teeth, the lowest tooth acute and longest (Fig. 1e); subantennal suture directed toward outer margin of antennal socket; face without longitudinal median ridge (Fig. 1b); fore wing with two submarginal cells, the first one slightly longer than the second one, basal vein nearly straight, meeting vein Cu at acute angle, 2nd m-cu slightly exceeding apical margin of 2nd submarginal cell, marginal cell distal to stigma on costa longer than stigma; stigma nearly twice as long as broad, prestigma short, less than twice as long as broad (Fig. 1f); jugal lobe of hind wing less than half as long as vannal lobe, vein cu-v oblique and short, obviously less than half as long as second abscissa of M+Cu; pronotal lobe with a dorsal-anterior carina; omaular carina present, extending down only to middle of mesepisternum (Fig. 1c); axilla rounded and not produced posteriorly (Fig. 1d); metanotum without median spine; scuto-scutellar fovea open, each half of scuto-scutellar fovea about four times as wide as long (Fig. 1d); fovea behind propodeal spiracle rounded, delimited by strong carina (Fig. 2a), basal zone of propodeum distinct laterally, with regular, shiny pits (Fig. 2a); basal margin of T1 with carina; pygidial plate absent; front and middle tibia with one spine on outer side (Fig. 2b), hind tibia without spine (Fig. 2e); outer surface of tibiae without tubercles; tarsal claws with inner median tooth, arolia present (Fig. 2c). Clypeus, mandible, vertex, frons, pronotal lobe, mesoscutum, scutellum, and all legs black; paraocular area at ventral extreme with a little sub-rectangle dull yellow mark (Fig. 1b); metasoma black, only T3–T5 with broader yellow bands, and the band on T3 obviously interrupted medially (Fig. 2d). Pubescence sparse; clypeus, paraocular area with sparse paler white short hairs; vertex, mesoscutum and scutellum covered with sparse blackish-brown short hairs; apical margin of S6 with fine and denser dull brownish-yellow hairs (Fig. 2e); S2–S5 with denser, longer golden-yellow hairs forming scopa for pollen-carrying (Fig. 2f).

Male, unknown.

Type material: Holotype: ♀, China, Guangdong, Fengkai Xian (32°00'N 113°24'E), 24.IV.2013, Ming-Hua ZHANG; Paratype: 1 ♀, same label information as holotype.

Floral association: *Ilex triflora* (Aquifoliaceae).

General distribution: China (Guangdong).

Etymology: The type location Fengkai (Guangdong province, China) is given as the specific name.

***Bathanthidium (Bathanthidium) hainanense* Niu, Wu & Zhu, 2012**

(Figs see Niu, *et al.*, 2012: Figs 1–12)

Bathanthidium (Bathanthidium) hainanense Niu, Wu & Zhu, 2012: 61, ♀, Figs. 1–12. Holotype: ♀, China, Hainan, Wuzhi Mountain, 1147 m, 10.IV.2010, Mei-Ying LING, IZCAS.

Material examined: China, Hainan: Wuzhi Mountain (18°53'N, 109°41'E), 1 ♀ (holotype), 1147 m, 10 IV. 2010, leg. Mei-Ying LING.

Floral association: no record.

General distribution: China (Hainan).

***Bathanthidium (Manthidium) atriceps* (Morawitz, 1890)**

(Fig. 3, a–e, female; Fig. 4, a–e, male)

Anthidium atriceps Morawitz, 1890: 373, ♀. Type locality: Kau-ssu, Upin (China, Gansu, Upin), not examined; Dalla Torre, 1896: 456.

Dianthidium (Bathanthidium) atripes (Morawitz, 1890): Mavromoustakis, 1953: 838, ♂ (new description).

Bathanthidium (s. str.) *atriceps* (Morawitz, 1890): Wu, 2006: 128, ♀, ♂ (key), 131, ♀, ♂ (redescription); Niu, *et al.*, 2012: 61, ♀, ♂ (key).

Material examined: China, Shaanxi: Ningshan Xian, Huoditang (33°26'N, 108°27'E), 1 ♀, 1580 m, 29.VII.1998, 1 ♀, 1500–2000 m, 18.VIII.1998, leg. De-Cheng YUANG; Foping (23°30'N, 107°54'E), 1 ♀, 9.VIII.1973, leg.

Xue-Zhong ZHANG; Zhejiang: Tianmu Shan (25°30'N, 109°54'E), 1 ♂, 12.V.1937, leg. O. Piel; Fujian: Jiangle Xian, Longqishan (26°43'N, 117°24'E), 1 ♀, 20.V.1991, leg. Chun-Mei HUNG; Xizang: Chayu Country, Cawarong Township, Long Village (28°33'N, 98°14'E), 2 ♀, 2906 m, 8.IX.2014, Qing-Tao WU.

Floral association: no record.

General distribution: China (Shaanxi*, Zhejiang*, Fujian, Gansu, Xizang*).

Remarks: *Bathanthidium atriceps* has been put into the subgenus *Bathanthidium* s. str. in past (Wu, 2006, Niu, *et al.*, 2012, Ascher & Pickering, 2017), but the fovea behind propodeal spiracle elongate, weakly delimited, without strong carina (Fig. 3d), and basal zone of propodeum not distinct (Fig. 3e), and T6 of male with elevated median section and concave lateral section (Fig. 3i), all these characters indicate it should be transferred to the subgenus *Manthidium*.

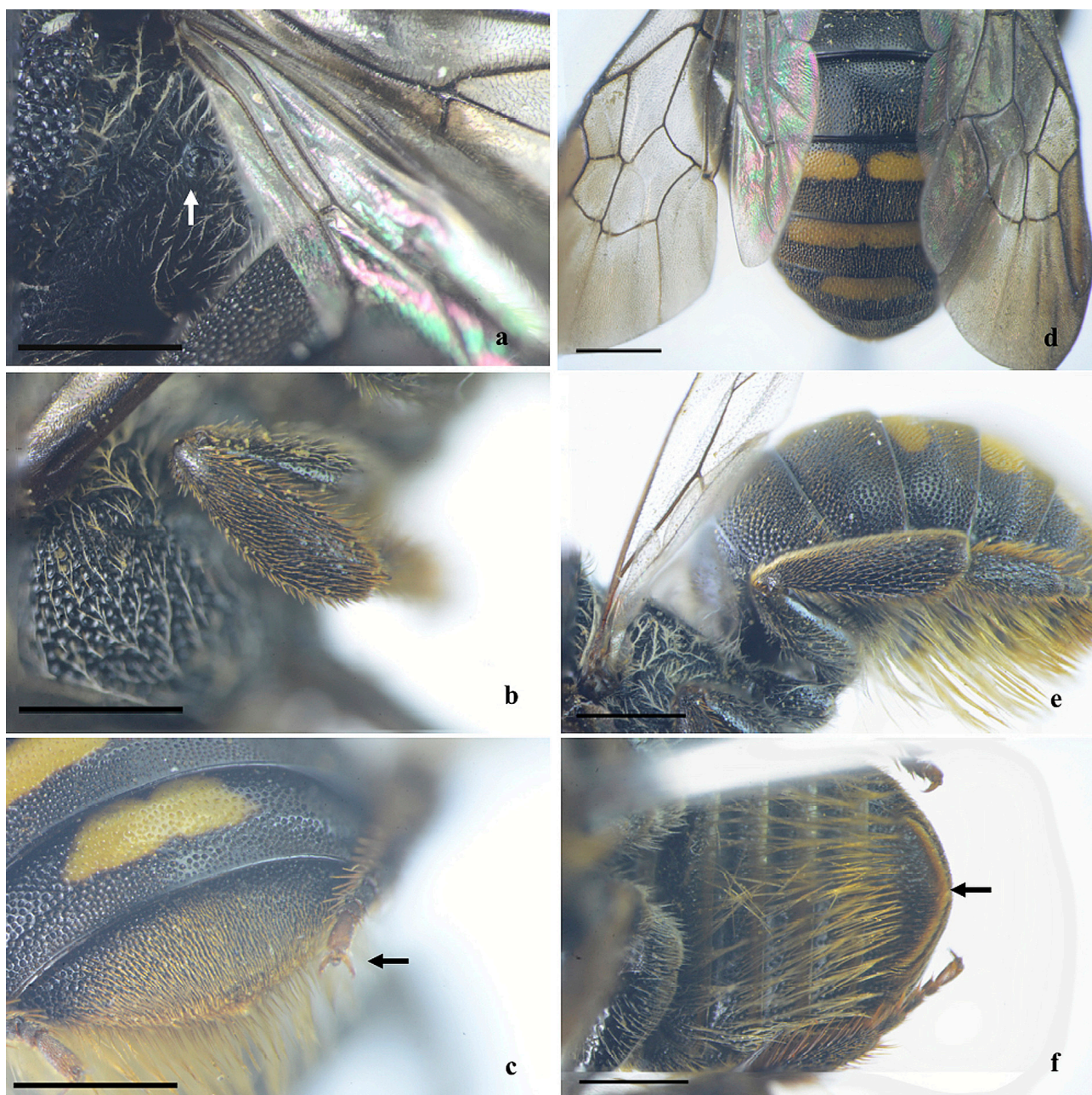


FIGURE 2. *Bathanthidium (Bathanthidium) fengkaiense* Niu & Zhu, sp. nov., female. a: Fovea behind the spiracle in dorso-lateral view; b: Middle tibial spine in lateral view; c: Claw of hind leg in lateral view; d: Metasoma in dorsal view, showing the pattern of yellow markings on metanotum; e: Metasoma in lateral view, showing the scopa; f: Metasoma in ventral view, showing S6. Scale bars: 1mm.

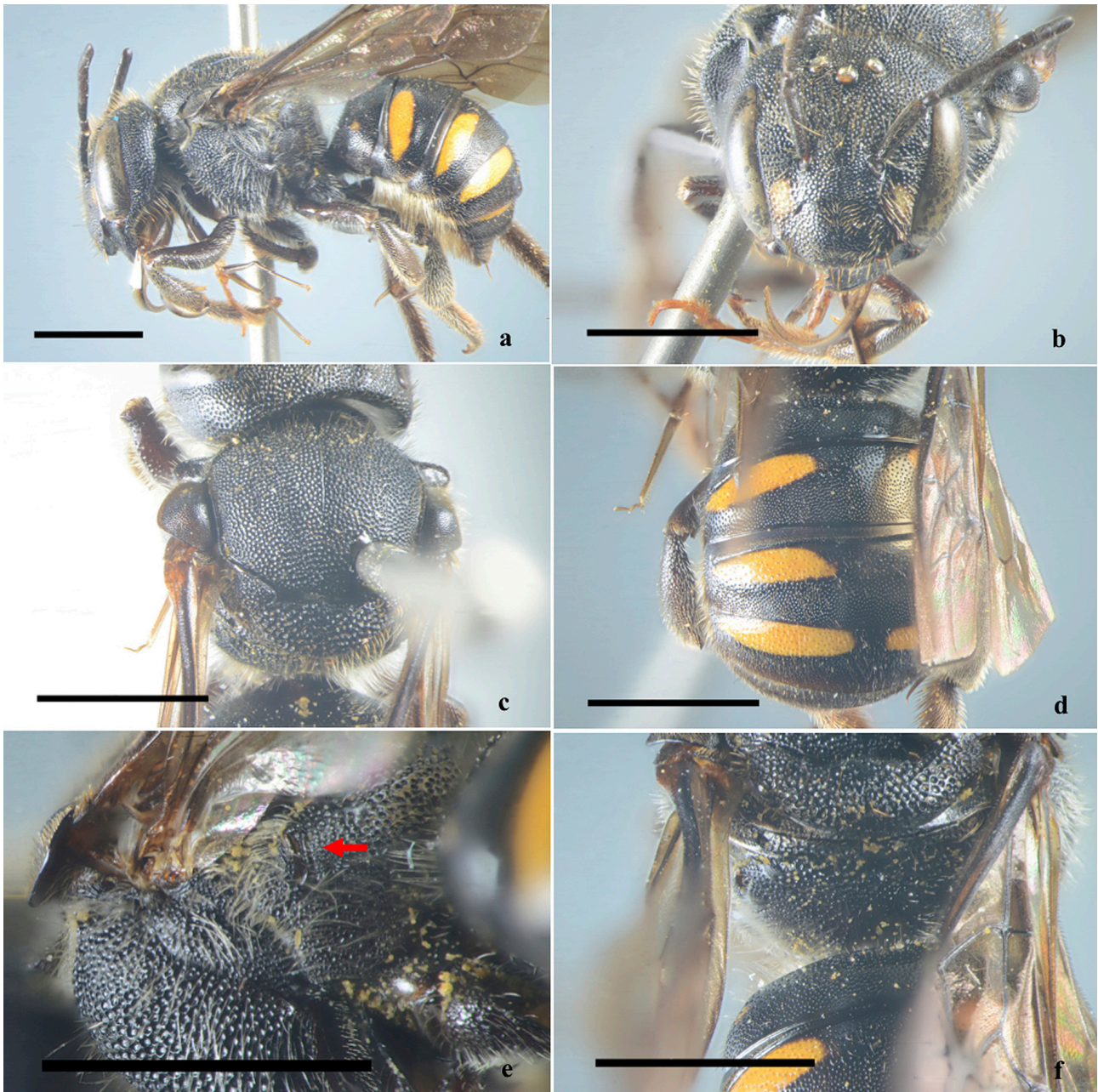


FIGURE 3. *Bathanthidium (Manthidium) atriceps* (Morawitz, 1890). Female. a: Body in lateral view; b: Head in frontal view; c: Mesosoma in dorsal view; d: Metasoma in dorsal view; e: Fovea behind the spiracle in dorsolateral view; f: Propodeum in dorsolateral view. Scale bars: 1mm.

***Bathanthidium (Manthidium) barkamense* (Wu, 1986)**

(Fig. 5, a–h, male; Fig. 6, a–h, female)

Dianthidium barkamensis Wu, 1986: 214, ♂, Figs. 3–9. Holotype: ♂, China: Sichuan, Barkam, 2700 m, 22.VII.1983, leg. Xue-Zhong ZHANG, IZCAS; Wu, 1993: 1397, ♀ (new description), Fig. 12 a–b.

Trachusa (Paraanthidium) barkamensis (Wu, 1986): Wu, 2006: 173, ♀ (key), 174, ♂ (key), 185, ♀, ♂ (redescription), Fig. 102 a–g.

Bathanthidium barkamensis (Wu, 1986): Kasperek, 2017: 17.

Material examined: China, Sichuan: Barkam (31°54'N, 102°12'E), 1 ♂ (holotype), 2700 m, 22.VII.1983, leg. Xue-Zhong ZHANG; Miyaluo (31°48'N, 102°48'E), 1 ♀, 2800 m, 12.VIII.1981, leg. Rui-Qi WANG; Kangding, Yalong

(29°18'N, 101°06'E), 1 ♀, 19.VIII.1981, leg. Jin-Wen SHANG; Hunan: Dayong (29°06'N, 110°24'E), 1 ♀, 350 m, 19.VIII.1988, leg. Long-Long YANG.

Floral association: no record.

General distribution: China (Sichuan, Hunan).

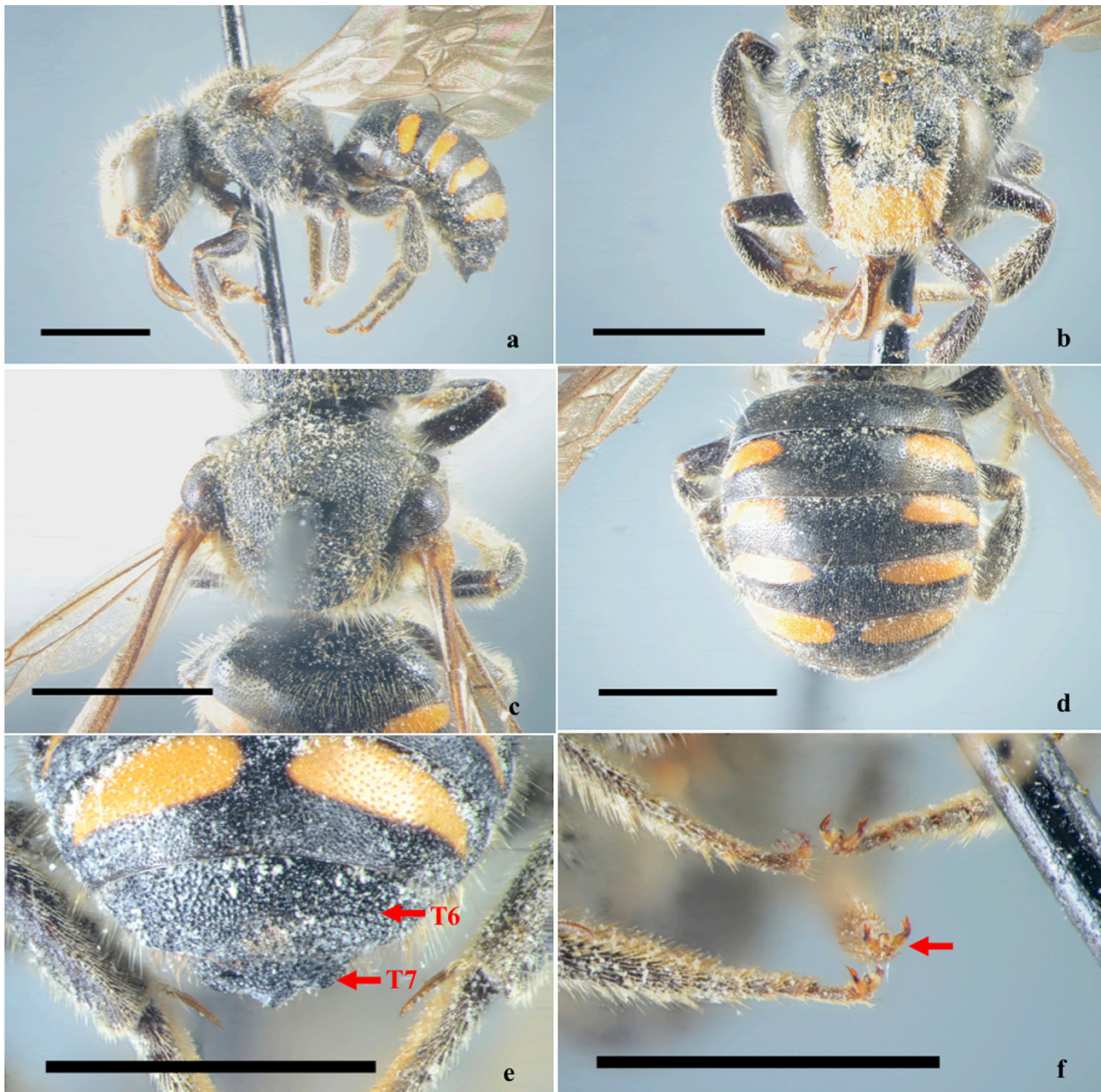


FIGURE 4. *Bathanthidium (Manthidium) atriceps* (Morawitz, 1890). Male. a: Body in lateral view; b: Head in frontal view; c: Mesosoma in dorsal view; d: Metasoma in dorsal view; e: T5-T7 in dorsal view; f: Claws in frontal view, showing the arolia. Scale bars: 1mm.

***Bathanthidium (Manthidium) bicolor* (Wu, 2004), comb. nov.**

(Fig. 7, a–h, male)

Anthidium (Anthidium) bicolor Wu, 2004: 542, ♂. Holotype: ♂, China, Sichuan, Kangding, 2400–2700 m, 15.VII.1963, Jin-Long MAO, IZCAS; Wu, 2006: 145, ♂ (key), 158, ♂ (redescription), Fig. 80.

Material examined: China, Sichuan: Kangding (30°00'N 101°54'E), 1 ♂ (holotype), 2400–2700 m, 15.VII.1963, leg. Jin-Long MAO.

Floral association: no record.

General distribution: China (Sichuan).

Remarks: *Bathanthidium bicolor* is very similar to *B. barkamense*. They share the distinctive red tegulae and red markings on the legs, and both have a thin paraocular marking, the marking of *B. barkamense* extending along the inner margin nearly to the top of the eye, but the marking of *B. bicolor* only extending to the middle of the eye.

***Bathanthidium (Manthidium) binghami* (Friese, 1901)**

(Fig. 8, a–h, male)

Anthidium fraternum Bingham, 1897 (nec. Pérez, 1895): 495, ♀. Type locality: Tenasserim.

Anthidium binghami Friese, 1901: 224, replacement name of *Anthidium fraternum* Bingham, 1897.

Manthidium binghami (Friese, 1901): Pasteels, 1969: 43.

Stelis siamensis Friese, 1925, 40, ♂. Type locality: Siam (now Thailand). **New Synonym.**

Bathanthidium (Manthidium) binghami (Friese, 1901): Rasmussen & Ascher, 2008: 30.

Paraanthidium concavum Wu, 1962: 164, ♂. Holotype: ♂, China, Yunnan, Xishuangbannan, 31.VIII.1957, Guang-Ji HONG, IZCAS. **New Synonym.**

Trachusa (Paraanthidium) concavum (Wu, 1962): Wu, 2006: 174, ♂ (key), 184, ♂ (redescription), Fig. 100a–e.

Material examined: China, Yunnan: Xishuangbannan, Xiaomenyang (22°06'N, 100°53'E), 1 ♂ (holotype of *P. concavum*), 31.VIII.1957, leg. Guang-Ji HONG.

Floral association: no record.

General distribution: Sikkim, northeastern India, Burma, Thailand, Laos, China (Yunnan).

Remarks: The distribution of this species and its subgenus were cited erroneously by Michener (2000, 2007) to include Malaysia. The “Malaysia” record is based on Pasteels’ (1969) misinterpretation of the locality “Luang Prabang” which is the capital of Luang Prabang Province in northern Laos. Thus, subgenus *B. (Manthidium)* should be excluded from the fauna of Sundaland.

The holotypes of *Anthidium fraternum*, *Paraanthidium concavum* and *Stelis siamensis* have been studied and found to be synonymous.

***Bathanthidium (Manthidium) moganshanense* (Wu, 2004), comb. nov.**

(Fig. 9, a–h, male)

Anthidium (s. str.) *moganshanensis* *_sic* Wu, 2004: 544, ♂. Holotype: ♂, China, Zhejiang, Moganshan, 30.V.1936, O. Piel, IZCAS; Wu, 2006: 146, ♂ (key), 165, ♂ (redescription), Fig. 87.

Material examined: China, Zhejiang: Moganshan (30°36'N, 119°48'E), 1 ♂ (holotype), 30.V.1936, leg. O. Piel.

Floral association: no record.

General distribution: China (Zhejiang).

Remarks: It is possible that *B. moganshanense* is a junior synonym of *B. atriceps*. The holotype lacks T6–T7, S6–S8, and the genitalia. In the absence of these structures and descriptions or figures of them, a determination of status is difficult.

***Bathanthidium (Stenanthidiellum) emeiense* Wu, 2004**

(Figs see Niu, *et al.*, 2012: Figs 21–28)

Bathanthidium (s. str.) *emeiense* Wu, 2004: 541, ♀. Holotype: ♀, China, Sichuan, Mt. Emei, 550–570 m, 23.V.1964, Yan-Ru WU, IZCAS; Wu, 2006: 128, ♀ (key), 131, ♀ (redescription), Fig. 64; Niu, *et al.*, 2012: 61, ♀ (key), Figs. 21–28.

Material examined: China, Sichuan: Mt. Emei (29°30'N, 103°18'E), 1 ♀ (holotype), 550–570 m, 23.V.1964, leg. Yan-Ru WU; 2 ♀ (paratypes), same label information as holotype, 1 ♀, 800–1000 m, 10.VI.1957, leg. Ke-Ren HUANG.

Floral association: no record.

General distribution: China (Sichuan).

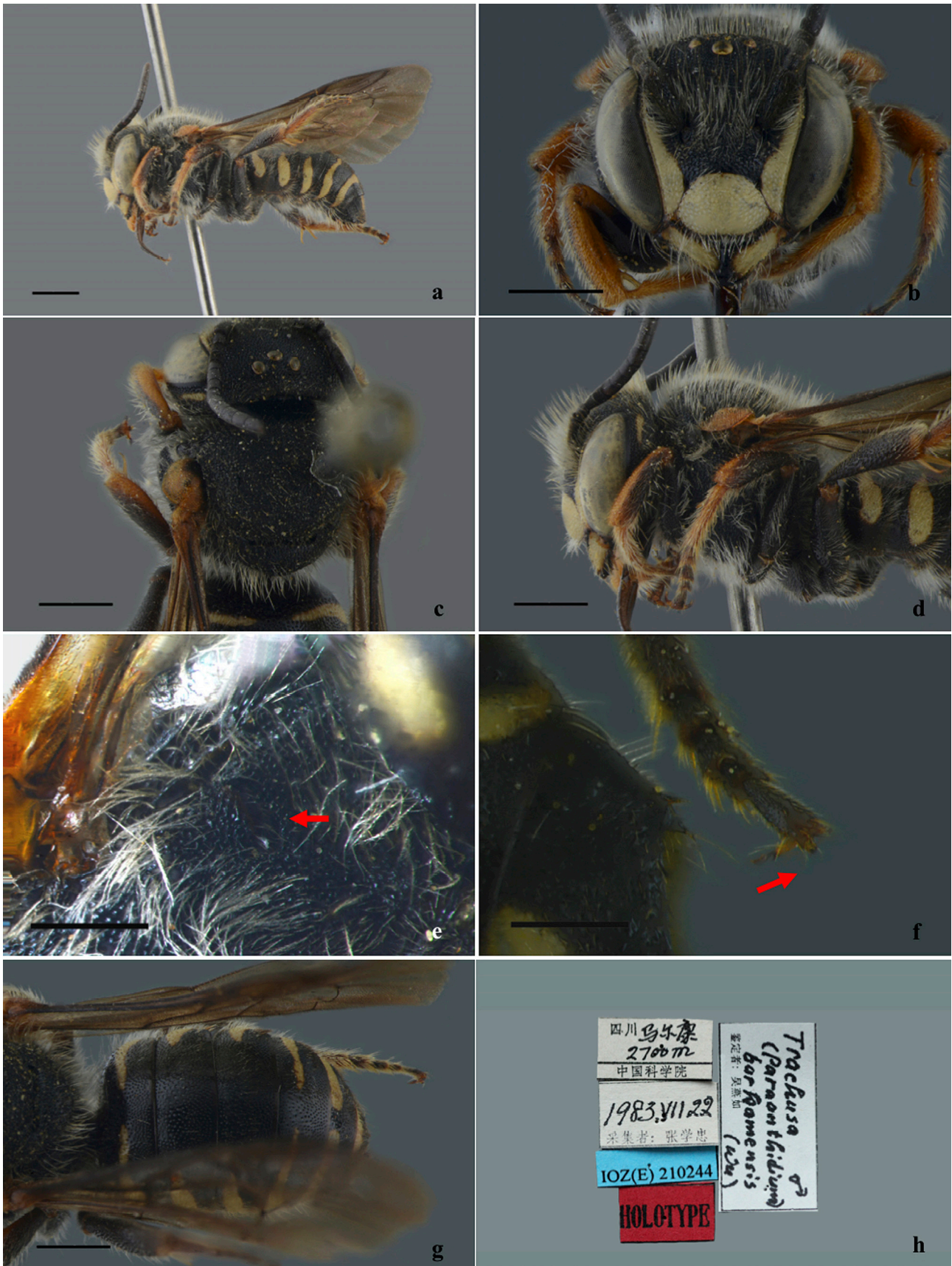


FIGURE 5. *Bathanthidium (Manthidium) barkamense* (Wu, 1986). Male. a: Body in lateral view; b: Head in frontal view; c: Mesosoma in dorsal view; d: Mesosoma in lateral view; e: Fovea behind the spiracle in dorsolateral view; f: Claws in frontal view, showing the arolia; g: Metasoma in dorsal view; h: Type labels. Scale bars: a–f, 1mm, g, 0.5mm.

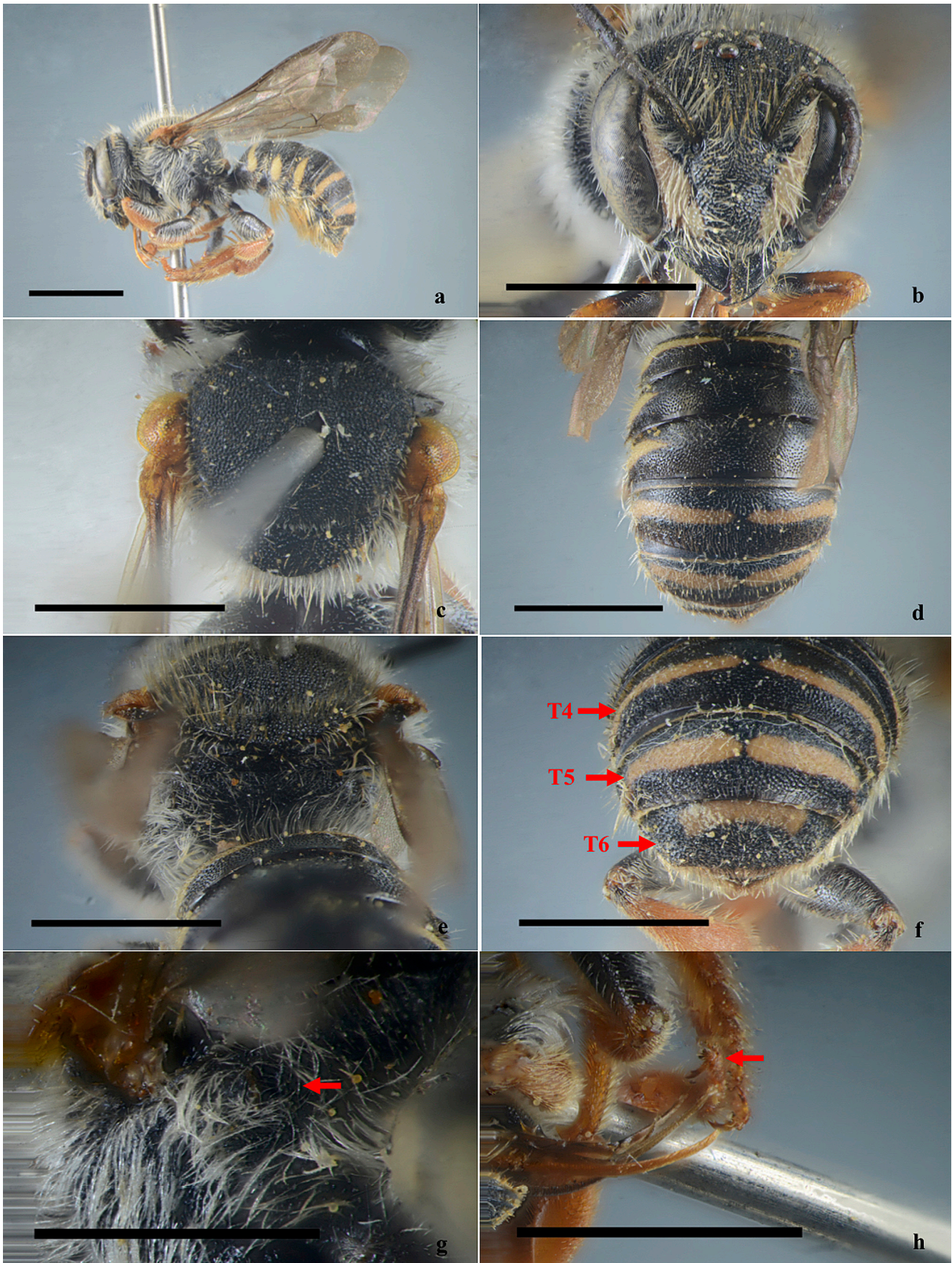


FIGURE 6. *Bathanthidium (Manthidium) barkamense* (Wu, 1986). Female. a: Body in lateral view; b: Head in frontal view; c: Mesosoma in dorsal view; d: Mesosoma in lateral view; e: Propodeum in dorsolateral view; f: Metasoma frontal view, showing the T4-T6; g: Fovea behind the spiracle in dorsolateral view; h: Claws in frontal view, showing the arilia. Scale bars: a–f, 1mm, g–h, 0.5mm.



FIGURE 7. *Bathanthidium (Manthidium) bicolor* (Wu, 2004). Male. a: Body in lateral view; b: Head in frontal view; c: Mesosoma in dorsal view; d: Mesosoma in lateral view; e: Claws in frontal view, showing the arolia; f: Fovea behind the spiracle in dorsolateral view; g: Metasoma in dorsal view; h: Type labels. Scale bars: a–d, g, 1mm, e–f, 0.5mm.



FIGURE 8. *Bathanthidium (Manthidium) binghami* (Friese, 1901). Male. a: Body in lateral view; b: Head in frontal view; c: Mesosoma in dorsal view; d: Mesosoma in lateral view; e: Metasoma in dorsal view; f: Fovea behind the spiracle in dorsolateral view; g: Claws in frontal view, showing the arolium; h: Type labels. Scale bars: a–e, 1mm, f–g, 0.5mm.

Bathanthidium (Stenanthidiellum) malaisei (Popov, 1941)

Anthidium sibiricum Gussakovskij, 1932: 59, ♀ (nec. Eversmann, 1852), not examined.

Stelis (Protostelis) malaisei Popov, 1941: 222, ♂ (new description).

Lasanthidium malaisei (Popov, 1941): Romankova, 1988: 26.

Bathanthidium (Stenanthidiellum) malaisei (Popov, 1941): Proshchalykin, 2004: 7; Niu, *et al.*, 2012: 61, ♀, ♂ (key); Proshchalykin, 2013: 150 (Fig.12–13), 153.

Material examined: no additional specimens examined.

Floral association: no record.

General distribution: South Korea.

Bathanthidium (Stenanthidiellum) rubopunctatum (Wu, 1993)

(Fig. 10, a–h, male; Fig. 11, a–h, female)

Anthidium rubopunctatum Wu, 1993: 1397, ♀, ♂. Holotype: ♂, China, Yunnan, Zhongdian, Tuguan, 2900 m, 7.VIII.1984, Jian-Guo FAN, IZCAS.

Trachusa (Paraanthidium) rubopunctata (Wu, 1992): Wu, 2006: 173, ♀ (key), 174, ♂ (key), 187, ♀, ♂ (redescription), Figs. 103a–e, incorrect publishing time.

Bathanthidium (Stenanthidiellum) rubopunctatum (Wu, 1992): Kasperek, 2017: 18, incorrect publishing time.

Material examined: China, Yunnan: Zhongdian, Tuguan (27°18'N, 99°54'E), 1 ♂ (holotype), 2900 m, 7.VIII.1984, leg. Jian-Guo FANG; 2 ♀ (paratypes), same label information as holotype; Zhongdian, Chonghe (27°42'N, 99°42'E), 1 ♀ (paratype), 2900 m, 7.VII.1984, leg. Shu-Yong WANG; Zhongdian, Gezá (27°42'N, 99°42'E), 1 ♀ (paratype), 3100 m, 9.VII.1984, leg. Xue-Zhong ZHANG, 1 ♀ (paratype), 5.VIII.1981, leg. Su-Bai LIAO; Weixi, Pantiang (27°06'N, 99°12'E), 1 ♂ (paratype), 2500 m, 27.VII.1981, leg. Xue-Zhong ZHANG; Lijiang, Yulong Shan (27°06'N, 100°06'E), 1 ♂ (paratype), 3000 m, 19.V.1984, leg. Rui-Qi WANG; Sichuan: Xiangcheng, Caike (28°54'N, 99°48'E), 1 ♀, 3000 m, 21.VI.1982, leg. Huai-Cheng CAI.

Floral association: *Ligularia* sp. (Asteraceae).

General distribution: China (Yunnan, Sichuan).

Remarks: This species appears close to *B. atriceps*. *Bathanthidium rubopunctatum* differs from *B. atriceps* in larger size, coarser tergal punctation, T7 medial projection triangular point with lateral shoulders, propodeal triangle with rather wide, sparsely punctate area (as opposed to punctures restricted to small area medially), and ocellocipital distance >2.5 times lateral ocellar diameter (compared to 2 or less). The female differs from females of *B. atriceps* in: terga more densely punctate throughout including maculations (as opposed to very sparse in maculae), mandible with 3rd tooth more than 2x as far from dorsal tooth as from 2nd tooth, ocellocipital distance >3x ocellar diameter (compared to slightly more than 1x).

Bathanthidium (Stenanthidiellum) sibiricum (Eversmann, 1852)

(Figs see Niu, *et al.*, 2012: Figs 42–54)

Anthidium sibiricum Eversmann, 1852: 85, ♀. Type locality: “in terris transuralensibus”, not examined; Dalla Torre, 1896: 470; Wu, 1993: 1399.

Dianthidium sibiricum (Eversmann, 1852): Cockerell, 1924: 526, ♂ (new description).

Bathanthidium (Stenanthidiellum) sibiricum (Eversmann, 1852): Wu, 2006: 132, ♀, ♂ (redescription), Fig. 65a–c; Proshchalykin, 2004: 7; Proshchalykin, 2007: 6; Niu, *et al.*, 2012: 61, ♀, ♂ (key); Proshchalykin, 2013: 150 (Fig.11), 153.

Material examined: China, Beijing: Shangfangshan (39°54'N, 115°40'E), 1 ♂, 9.VI.1982, leg. Shu-Fang WANG; Hebei: Xiaowutai (39°54'N, 115°00'E), 1 ♀, 12.VIII.1964, leg. Jin-Long MAO; 2 ♂, 1400 m, 14–16.VII.1964, leg. Yin-Heng HAN; Neimenggu: Bugt (48°48'N, 121°54'E), 1 ♀, 29.VIII.1971, leg. Xue-Zhong ZHANG; Heilongjiang: Dailing (47°00'N, 129°00'E), 1 ♀, 11.VII.1963, leg. Jiu-Wei BAI; Jiling: Changbai Shan (42°00'N, 128°06'E), 5 ♀, 2 ♂, 750 m, 6–11.VII.1987, leg. Jian-Guo FAN; Erdaobaihe (42°24'N, 128°06'E), 25 ♀, 1 ♂, 4.VII–3.VIII.1981, leg. Yan-Ru WU; Zhejiang: Tianmu Shan (30°24'N, 119°54'E), 1 ♀, 24.VIII.1936, leg. T.-C. MA, 1 ♀, 19.VIII.1937,



FIGURE 9. *Bathanthidium (Manthidium) moganshanense* (Wu, 2004). Male. a: Body in lateral view; b: Head in frontal view; c: Mesosoma in dorsal view; d: Mesosoma in lateral view; e: Fovea behind the spiracle in dorsolateral view; f: Claws in frontal view, showing the arolium; g: Metasoma in dorsal view; h: Type labels. Scale bars: a–d, g, 1mm, e–f, 0.5mm.



FIGURE 10. *Bathanthidium* (*Stenanthidiellum*) *rubopunctatum* (Wu, 1993). Male. a: Body in lateral view; b: Head in frontal view; c: Mesosoma in dorsal view; d: Mesosoma in lateral view; e: Metasoma in dorsal view; f: T5-T7 in dorsal view; g: Fovea behind the spiracle in dorsolateral view; h: Type labels. Scale bars: 1mm.

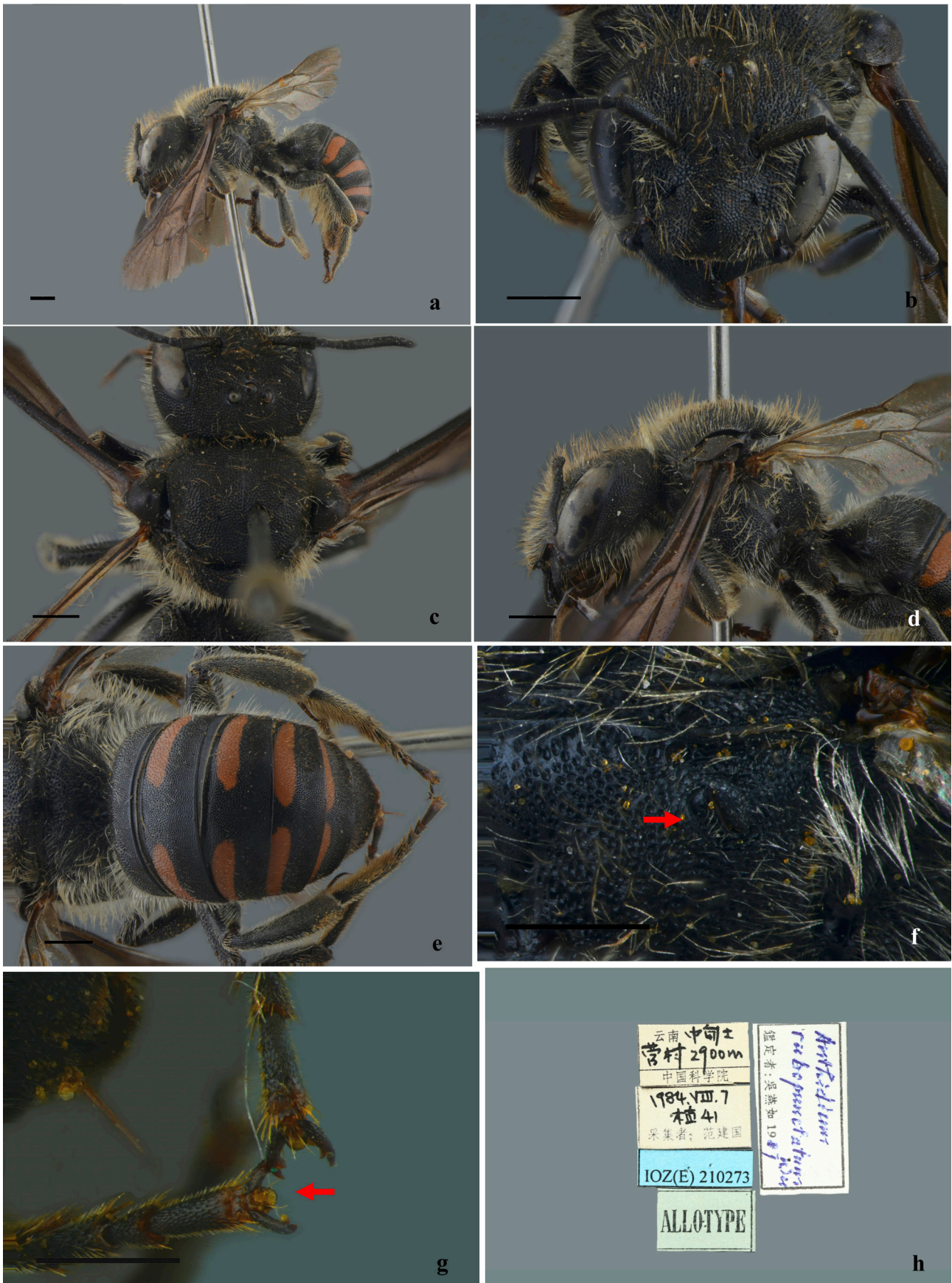


FIGURE 11. *Bathanthidium (Stenanthidiellum) rubopunctatum* (Wu, 1993). Female. a: Body in lateral view; b: Head in frontal view; c: Mesosoma in dorsal view; d: Mesosoma in lateral view; e: Metasoma in dorsal view; f: Fovea behind the spiracle in dorsolateral view; g: Claws in frontal view, showing the arolia; h: Type labels. Scale bars: a–e, 1mm, f–g, 0.5mm.

2 ♀, 3–15.IX.1947, leg. no information on label; Moganshan (30°36'N, 119°48'E), 2 ♀, 22–30.V.1936, leg. O. Piel, 1 ♂, 8.VII.1937, leg. no information on label; Hubei: Xingshan, Longmenhe (31°19'N, 110°29'E), 1 ♀, 1340 m, 24.VI.1993, Zigui, Jiulingtou (31°20'N, 110°48'E), 1 ♀, 150 m, 13.VI.1993, leg. Run-Zhi HUANG; Sichuan: Barkam (31°54'N, 102°12'E), 1 ♀, 3500 m, 20.VIII.1983, leg. Shu-Yong WANG; Xizang: Chayu County, Cawarong Township, 5km East of Menga Village (28°20'N, 98°11'E), 1 ♀, 3321 m, 10.IX.2014, leg. Qing-Tao WU.

Floral association: *Lespedeza bicolor* (Leguminosae), *Melilotus officinalis* (Leguminosae), Brassicaceae gen. et sp., *Potentilla chinensis* (Rosaceae).

General distribution: China (Beijing, Hebei, Neimenggu, Heilongjiang, Jilin, Shannxi*, Zhejiang, Hubei*, Guangdong, Sichuan, Yunnan, Xizang*), South Korea, Russia.

Remarks: Maculation on T1 of male varies, always with a small yellow maculation dorsolaterally, but some individual without maculation or the maculation different in size.

Excluded species

Pseudoanthidium (s. str.) *circinatum* (Wu, 2004), comb. nov.

(Figs see Niu, *et al.*, 2012: Figs 13–20)

Bathanthidium (*Bathanthidium*) *circinatum* Wu, 2004: 541, ♀. Holotype: ♀, China, Xinjiang, Yanqi, 6–7.VII.1958, Chang-Qing LI, IZCAS; Wu, 2006: 128, ♀ (key), 130, ♀ (redescription), Fig. 63.

Bathanthidium (*Stenanthidiellum*) *circinatum* Wu, 2004: Niu, *et al.*, 2012: 61, ♀ (key), Figs. 13–20.

Material examined: China, Xinjiang: Yanqi (41°00'N, 86°30'E), 1 ♀ (holotype), 6–7.VIII.1958, leg. Chang-Qing LI.

Floral association: no record.

General distribution: China (Xinjiang).

Acknowledgements

The authors sincerely thank Prof. Yan-Ru Wu, Dr. Yan-Zhou Zhang, Dr. Jason Gibbs, and two anonymous reviewers for their comments and suggestions to streamline and improve the earlier drafts of the manuscript.

This work was supported mainly by a grant from the National Science Foundation, China (31772487, 31625024). Chao-Dong ZHU acknowledges the supports of the National Science Fund for Singapore-China Joint Research Grant (41761144068), the grant (Y229YX5105) from Key Laboratory of Zoological Systematics and Evolution, Chinese Academy of Sciences. John S. Ascher thanks Robert G. Goelet for his generous support of bee research at the American Museum of Natural History.

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