

ORIGINAL ARTICLE

Taxonomic study of the genus *Tetralonioidella* Strand from China (Hymenoptera: Apidae: Melectini)

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Abstract The Chinese cleptoparasitic bee genus *Tetralonioidella* Strand, 1914 is studied. Fourteen species are found in China, with nine new species, namely *T. damenglongensis* Niu & Zhu, **sp. nov.**, *T. dinghuensis* Niu & Zhu, **sp. nov.**, *T. emeiensis* Niu & Zhu, **sp. nov.**, *T. goumenensis* Niu & Zhu, **sp. nov.**, *T. leigongensis* Niu & Zhu, **sp. nov.**, *T. longqiensis* Niu & Zhu, **sp. nov.**, *T. maniwengensis* Niu & Zhu, **sp. nov.**, *T. tianmuensis* Niu & Zhu, **sp. nov.** and *T. wuae* Niu & Zhu, **sp. nov.**, respectively. *T. pendleburyi* (Cockerell, 1926) is firstly recorded in China. An illustrated key to Chinese known species is provided. All type specimens of new species are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China.

Key words Apoidea, Apiformes, cleptoparasite, new species, taxonomy.

1 Introduction

The genus *Tetralonioidella* was conditionally erected by Strand (1914) in his original description of *Tetralonia* (?) *hoozana* from Taiwan, China. *T. hoozana* was designated as type species of the genus *Tetralonioidella* by Lieftinck (1983). At present, *Tetralonioidella* is exclusively distributed in the Oriental Realm and includes ten species (Ascher & Pickering, 2016). Species distribution ranges from northern India and Nepal along the Himalayas through southeast China, as well as Thailand and Malaysia and as far as Sumatra and Java in south (Michener, 2007). The species of *Tetralonioidella* without patches of appressed white pubescence on metasomal terga can be easily distinguished from other melectine bees.

In China, four species, *T. hoozana*, *T. heinzi*, *T. himalayna formosa* and *T. fukienensis*, were reported by different scholars (Strand, 1914; Lieftinck, 1944, 1972, 1983; Dubitzky, 2007). Chinese scholars did not study the related species previously. However, its hosts, such as *Habropoda* and *Elaphropoda*, were recorded by Wu (2000).

Based on specimens from China and the review of published information which provided different characters to distinguish species (Lieftinck, 1944, 1972, 1983; Dubitzky, 2007), fourteen species of *Tetralonioidella* are recognized from China, including nine new species and one newly recorded species. Totally, there are at least nineteen species all over the world (Table 1). The result shows that *Tetralonioidella* has higher species diversity in China than previously documented.

2 Materials and methods

All specimens examined, including the types of new species, 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. The morphological terminology used in the descriptions mainly 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;

MsW—mesosomal width, measured between the outer rims of the tegulae in dorsal view;

MtW—metasomal width, the greatest width of the metasomal tergum in dorsal view;

T1, T2..., S1, S2... and F1, F2...—the first, second... segments of tergum, sternum and flagellomere, respectively.

Table 1. Checklist of the species in *Tetralonioidella*, with their known gender and distribution.

Species	Gender known	Distribution
<i>T. fukienensis</i> Lieftinck, 1983	♂	China (Fujian, Hong Kong); Laos
<i>T. habropodae</i> (Cockerell, 1929)	♂	Thailand
<i>T. heinzi</i> Dubitzky, 2007	♀, ♂	China (Taiwan)
<i>T. himalayana</i> (Bingham, 1897)	♀, ♂	China (Xizang, Taiwan); India
<i>T. hoozana</i> (Strand, 1914)	♀, ♂	China (Taiwan)
<i>T. insidiosa</i> (Lieftinck, 1944)	♀, ♂	Java
<i>T. nepalensis</i> Lieftinck, 1983	♂	Nepal
<i>T. pendleburyi</i> (Cockerell, 1926)	♀, ♂	China (Sichuan); Malaysia
<i>T. tricolor</i> (Lieftinck, 1972)	♀	India
<i>T. vulpecula</i> (Lieftinck, 1944)	♀, ♂	Sumatra
<i>T. damenglongensis</i> Niu & Zhu, sp. nov.	♀	China (Yunnan)
<i>T. dinghuensis</i> Niu & Zhu, sp. nov.	♂	China (Guangdong)
<i>T. emeiensis</i> Niu & Zhu, sp. nov.	♂	China (Sichuan)
<i>T. guomenensis</i> Niu & Zhu, sp. nov.	♂	China (Yunnan)
<i>T. leigongensis</i> Niu & Zhu, sp. nov.	♂	China (Guizhou)
<i>T. longqiensis</i> Niu & Zhu, sp. nov.	♀, ♂	China (Fujian)
<i>T. maniwegensis</i> Niu & Zhu, sp. nov.	♂	China (Xizang)
<i>T. tianmuensis</i> Niu & Zhu, sp. nov.	♂	China (Zhejiang)
<i>T. wuae</i> Niu & Zhu, sp. nov.	♀, ♂	China (Hunan, Hubei, Sichuan, Guizhou, Hainan)

3 Systematics

Tetralonioidella Strand, 1914

Tetralonioidella Strand, 1914 (Apr.-May): 140. Type species: *Tetralonia* (?) *hoozana* Strand, 1914, monobasic.

Protomelissa Friese, 1914 (June): 322. Type species: *Protomelissa iridescens* Friese, 1914 = *Tetralonia* (?) *hoozana* Strand, 1914, by designation of Sandhouse, 1943: 592. [See also Michener, 1997]

Callomelecta Cockerell, 1926: 621. Type species: *Callomelecta pendleburyi* Cockerell, 1926, by original designation.

Diagnosis. Body size small to medium (body length 8.5 to 13.5 mm); rather slender melectine bees without patches of appressed white pubescence, metasomal terga uniformly covered with feathery appressed hairs, typical lateral hair patches of pale short pubescence on metasomal terga absent (sometimes conspicuous hair bands of yellowish to reddish brown hairs developed); marginal cell distinct longer than distance from its apex to wing tip, extending well beyond the third submarginal cell, usually slightly shorter than three submarginal cells together; scutellum convex, with distinct longitudinal carina in the

middle and two ventrally curved spines laterally.

Key to Chinese species of *Tetralonioidella*.

1. Female, flagellum 10-segmented (Figs 3d, 4d, 15d, 22d) 2
Male, flagellum 11-segmented (Figs 1d, 5d, 7d, 9d, 11d, 13d, 16d, 18d, 20d)..... 8
2. Fore wing with numerous minute hairs apically, distinct papillae absent (Fig. 22e) 3
Fore wing with distinct numerous papillae apically (Figs 3e, 4e, 15e) 4
3. Pubescence on scutum and metasomal terga denser, fox-red *T. heinzi* Dubitzky, 2007
Pubescence on scutum and metasomal terga sparser, yellowish-brown, not fox-red (Figs 22a, f, g) *T. wuae* Niu & Zhu, sp. nov.
4. Inner rami of hind tarsal claws claw-like (Fig. 4h) 5
Inner rami of hind tarsal claws axe-shaped (Figs 3h, 15h) 7
5. Scutum pubescent colour-pattern bicoloured, with broad, transverse, blackish-brown pubescent stripe between tegulae
..... *T. himalayana* (Bingham, 1897)
Scutum pubescent colour-pattern uniform, without broad, transverse, blackish-brown pubescent stripe between tegulae 6
6. Scutum pubescence pale gray, intermixed with blackish hairs (Figs 4a, f) *T. damenglongensis* Niu & Zhu, sp. nov.
Scutum pubescence uniformly fox-red *T. hoozana* (Strand, 1914)
7. Apical margin of labrum almost straight in frontal view (Fig. 3c); T1 covered with short, light yellowish-brown pubescence, T2–T4 with transverse lateral patches of light yellowish-brown pubescence (Fig. 3g) *T. pendleburyi* (Cockerell, 1926)
Apical margin of labrum weakly concave in frontal view (Fig. 15c); T1–T4 uniformly covered with short, light yellowish-brown pubescence (Fig. 15g) *T. longqiensis* Niu & Zhu, sp. nov.
8. Fore wing with numerous minute hairs apically, distinct papillae absent (Fig. 21a) 9
Fore wing with distinct numerous papillae apically (Figs 2a, 6a, 8a, 10a, 12a, 14a, 17a, 19a) 10
9. Ventral surface of apical part of S7 with stiff, short to long dense setae laterally (Fig. 21c) *T. wuae* Niu & Zhu, sp. nov.
Ventral surface of apical part of S7 with stiff, short and sparse setae laterally *T. heinzi* Dubitzky, 2007
10. Scutum pubescent colour-pattern bicoloured (Figs 1a, e, 7a, e) 11
Scutum pubescent colour-pattern uniform (Figs 5a, 9a, 11a, 13a, 16a, 18a) 12
11. Scutum with broad, transverse, blackish-brown pubescent stripe between tegulae (Fig. 1e); metasomal terga all covered with short, light yellowish-brown pubescence, not forming hair bands (Figs 1f, 2a); apical margin of median process of S8 convex (Fig. 2d).....
..... *T. himalayana* (Bingham, 1897)
Scutum with narrow, transverse, pale gray pubescent stripe between tegulae (Fig. 7e); T1–T5 with short, light yellowish-brown hair bands (Figs 7f, 8a); apical margin of median process of S8 distinctly concave (Fig. 8d)..... *T. emeiensis* Niu & Zhu, sp. nov.
12. Scutum pubescence uniformly fox-red or yellowish-orange (Fig. 9e) 13
Scutum pubescence pale or light yellowish-brown (Figs 5e, 11e, 13e, 16e, 18e)..... 16
13. Apical margin of labrum shallowly concave 14
Apical margin of labrum nearly straight (Fig. 9c) 15
14. Scutum pubescence uniformly fox-red; apical margin of median process of S8 straight, not concave *T. hoozana* (Strand, 1914)
Scutum pubescence yellowish-orange; apical margin of median process of S8 slightly concave *T. fukienensis* Liefstinck, 1983
15. Apical median part of S7 distinctly concave *T. pendleburyi* (Cockerell, 1926)
Apical median part of S7 slightly convex (Fig. 10c) *T. guomenensis* Niu & Zhu, sp. nov.
16. Apical margin of labrum nearly straight (Fig. 5c) *T. dinghuensis* Niu & Zhu, sp. nov.
Apical median margin of labrum slightly convex medially or apical margin of labrum concave (Figs 11c, 13c, 16c, 18c) 17
17. Apical median margin of labrum slightly convex medially (Figs 11c, 13c) 18
Apical margin of labrum concave (Figs 16c, 18c) 19
18. Apical margin of median process of S8 straight (Fig. 12d) *T. leigongensis* Niu & Zhu, sp. nov.
Apical margin of median process of S8 slightly concave (Fig. 14d) *T. longqiensis* Niu & Zhu, sp. nov.
19. Apical margin of median process of S8 concave, without projection medially (Fig. 17d) *T. maniwegensis* Niu & Zhu, sp. nov.
Apical margin of median process of S8 concave, but with a projection medially (Fig. 19d) *T. tianmuensis* Niu & Zhu, sp. nov.

***Tetralonioidella fukienensis* Liefstinck, 1983**

Tetralonioidella fukienensis Liefstinck, 1983: 280. Holotype ♂, SE China, NW Fukien, Chungan distr., Bohea Hills, 600 m, 25.IX.1935, coll. T.C. Maa; in Mus. Leiden.

Material examined. No additional material examined.

Distribution. China (Fujian, Hong Kong), Laos.

***Tetralonioidella heinzi* Dubitzky, 2007**

Tetralonioidella heinzi Dubitzky, 2007: 63, ♀♂, figs 1C, D, 6B, 7A, B, 8A. Holotype ♂, Taiwan, Meifeng, ca. 2150 m, Nantou Hsien,

Malaise trap, VIII.1984, coll. K.S. Lin & K.C. Chou; in Taiwan Agricultural Research Institute (TARI), Wufeng (Taichung).

Material examined. No additional material examined.

Distribution. China (Taiwan).

***Tetralonioidella himalayana* (Bingham, 1897)** (Figs 1–2)

Melecta himalayana Bingham, 1897: 516, ♀. Holotype ♀, North India, Kumano, 4.90, coll. Bingham; in British Museum (Natural History), London.

Melecta formosana Cockerell, 1911: 227, ♀. Type locality: Taiwan, Kosempo (Kaohsiung).

Anthophora sauteri Friese, 1911: 127. Type locality: Taiwan, Tainan.

Protomelissa sauteri (Friese): Friese, 1914: 323, ♀♂.

Protomelissa formosana (Cockerell): Lieftinck, 1972: 273, ♀♂ (key), 274, figs 1–2, 5–6.

Protomelissa himalayana (Bingham): Lieftinck, 1972: 273, ♀♂ (key), figs 3, 7–8.

Tetralonioidella formosana (Cockerell): Lieftinck, 1983: 271, ♂ (key), 276.

Tetralonioidella himalayana (Bingham): Lieftinck, 1983: 271, ♂ (key), 277, figs 13–14.



Figure 1. *Tetralonioidella himalayana* (Bingham, 1897), male. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Mesosoma, dorsal view. f. Metasoma, dorsal view. Scale bars = 1 mm.

Tetralonioidella himalayana formosana (Cockerell, 1911): Dubitzky, 2007: 57, ♀♂ (key), figs 6A, 7E, F, 8C.

Material examined. China, Xizang, Mêdog, Garasa (28°44'N, 95°01'E; elev. 1200 m), 1♂, 15.XI.1982, coll. Yinheng Han; Mêdog, Madi (29°24'N, 95°23'E; elev. 1000 m), 1♂, 14.XI.1988, coll. Jian Yao.

Distribution. China (Xizang, Taiwan), India.

Remark. The species is recorded in the mainland of China for the first time.



Figure 2. *Tetralonioidella himalayana* (Bingham, 1897), male. a. Fore wing, showing the papillae. b. Claw, showing the inner ramus. c. S7, ventral view. d. S8, ventral view. e. Genitalia, dorsal view. f. Genitalia, lateral view. Scale bars: a, e, f=1 mm; b, c, d=0.5 mm.

***Tetralonioidella hoozana* (Strand, 1914)**

Tetralonia hoozana Strand, 1914: 139, ♂. Type locality: Taiwan, Hoozan.

Protomelissa iridescens Friese, 1914: 324, ♂. Type locality: Taiwan, Takao.

Tetralonioidella hoozana Strand: Lieftinck, 1983: 272, ♂ (key), 274, figs 1–9; Dubitzky, 2007: 57, ♂♀ (key), 61, figs 6C, 7C, D, 8B, ♀ (nov.)

Material examined. No additional material examined.

Distribution. China (Taiwan).



Figure 3. *Tetralonioidella pendleburyi* (Cockerell, 1926), female. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Fore wing. f. Mesosoma, dorsal view. g. Metasoma, dorsal view. h. Claw, showing the inner ramus. Scale bars: a, b, c, d, e, f, g = 1 mm; h = 0.5 mm.

Tetralonioidella pendleburyi (Cockerell, 1926), new record to China (Fig. 3)

Callomelecta pendleburyi Cockerell, 1926: 621, ♀. Type locality: Malaya, Selangor. Lieftinck, 1944: 62, ♂ (descr. nov.), allotype, Malaya,



Figure 4. *Tetralonioidella damenglongensis* Niu & Zhu, **sp. nov.**, female. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Fore wing, showing the papillae. f. Mesosoma, dorsal view. g. Metasoma, dorsal view. h. Claw, showing the inner ramus. Scale bars: a, b, c, d, e, f, g = 1 mm; h = 0.5 mm.

Perak and Pahang, figs 1–9; 75–77, ♀♂ (key).

Protomelissa pendleburyi (Cockerell): Lieftinck, 1972: 272, ♀♂ (key), 280, figs 9–16.

Tetralonioidella pendleburyi (Cockerell): Lieftinck, 1983: 274, ♂ (key), 28, fig. 16.

Material examined. China, Sichuan, Huili, Yiding (26°35'N, 102°15'E; elev. 2000–2200 m), 1♀, 30.VII.1974, coll. Yinheng Han.

Distribution. China (Sichuan), Malaysia.

Remark. The species is recorded in China for the first time.

***Tetralonioidella damenglongensis* Niu & Zhu, sp. nov.** (Fig. 4)

Diagnosis. The species is different from other species of *Tetralonioidella* by pubescence on mesosomal terga pale gray intermixed with blackish pubescence, T1–T3 with yellowish-brown apical hair bands, and T4 with white apical hair band. And the pubescent color-pattern on metasomal terga is different from other species of *Tetralonioidella*.

Description. Female. BL 9.8 mm (Fig. 4a); head broader than long, HW:HL=66:45 (Fig. 4b); gena distinctly narrower than eye, GW:EW=9:15; width of metasoma slightly broader than the width between the tegulae, MtW:MsW=78:74. Clypeus broader than long (Fig. 4b); apical margin of labrum obviously concave (Fig. 4c); antenna long, reaching behind margin of tegula, scape conically broadened, longer than F1 and F2 together, flagellomere equal in breadth, F1 slightly longer than broad, F2 long than broad, nearly twice as long as broad, F3 equal in length with F4, about 1.5 times as long as broad, F5–F9 equal in length, about 1.2 times as long as broad, F10 rounded apically, equal in length with F3, about 1.5 times as long as broad (Fig. 4d); fore wing with distinct numerous papillae apically (Fig. 4e); scutellar spines slender, tapering sharp apically, barely visible between pubescence; inner ramus of hind tarsal claw claw-like, arolium present (Fig. 4h). Clypeus black except apical margin yellowish brown (Figs 4b–c); basal half part of mandible yellowish-brown, apical half part reddish (Fig. 4c); labrum black except apical 1/5 part yellowish brown (Fig. 4c); antenna dark blackish-brown beneath (Fig. 4d); tegula yellowish-brown (Fig. 4f); all legs blackish-brown; hind tarsal claw reddish apically (Fig. 4h). Scutum pubescence pale gray, intermixed with blackish hairs (Figs 4a, f); clypeus covered short pale white hairs, periphery of antennal socket, supraclypeal area, paraocular area and front surface of scape covered long pale white hairs (Fig. 4b); vertex, scutum, scutellum, metanotum covered with pale gray hairs, intermixed with blackish hairs (Figs 4a, d, f); genal area, episternum covered yellowish-white hairs (Fig. 4a); T1–T3 with short, light yellowish-brown hair bands before marginal zones, T4 with white hair band before marginal zone, disc of T1–T3 covered yellowish-brown hairs, intermixed black hairs, disc of T4 covered black hairs (Fig. 4g).

Male. Unknown.

Material examined. Holotype. ♀, China, Yunnan, Xishuangbanna, Damenglong (21°34'N, 100°41'E; elev. 650m), 22.IV.1958, Chunpei Hong.

Distribution. China (Yunnan).

Etymology. The type location Damenglong (Yunnan, China) is given as the specific name.

***Tetralonioidella dinghuensis* Niu & Zhu, sp. nov.** (Figs 5–6)

Diagnosis. The species is similar to male of *T. pendleburyi* by its apical margin of labrum almost straight, but different by its unique shape of S7 and S8.

Description. Male. BL 10.0 mm (Fig. 5a); head broader than long, HW:HL=68:51 (Fig. 5b); gena distinctly narrower than eye, GW:EW=12:18; width of metasoma broader than the width between the tegulae, MtW:MsW=78:70. Clypeus slightly broader than long (Fig. 5b); apical margin of labrum straight (Fig. 5c); antenna short, reaching front margin of tegula, scape conically broadened, as long as F1 to F3 together, flagellomere equal in breadth, F1 longer than broad, nearly 1.2 times as long as broad, F2 long than broad, nearly 1.6 times as long as broad, F3 equal in length with F4, about 1.2 times as long as broad, F5–F10 equal in length, nearly as long as broad, F11 rounded apically, equal in length with F3, about 1.4 times as long as broad (Fig. 5d); fore wing with distinct numerous papillae apically (Fig. 6a); scutellar spines short and broad, pointed apically, barely visible between pubescence; inner ramus of hind tarsal claw axe-shaped, arolium present (Fig. 6b); ventral surface of apical part of S7 with dense setae laterally, median part slightly convex, with sparse setae (Fig. 6c); apical margin of median process of S8 slightly concave (Fig. 6d); genitalia as illustrated in Fig. 6e (in dorsal view) and Fig. 6f (in lateral view), basal part of gonostylus with blunt triangular process dorsally, and the process with dense long hairs along dorsal margin (Fig. 6f). Clypeus black (Fig. 5b); mandible blackish-brown except reddish apically; labrum blackish-brown with two small bright brown spots laterally (Fig. 5c); antenna dark blackish-brown beneath (Fig. 5d); tegula yellowish-brown

(Fig. 5e); all legs blackish-brown except mediotarsus and distitarsus dark yellowish-brown; hind tarsal claw blackish-brown apically (Fig. 6b). Scutum pubescence yellowish-brown (Figs 5a, e); clypeus, periphery of antennal socket, supraclypeal area, paraocular area and front surface of scape covered with sparse yellowish-brown hairs (Fig. 5b); vertex, genal area, scutum, scutellum, metanotum and episternum covered with dense and long yellowish-brown hairs (Figs 5a, d–e); all metasomal terga uniformly covered with thin and short yellowish hairs (Fig. 5f).

Female. Unknown.

Material examined. Holotype. ♂, China, Guangdong, Mt. Dinghu (23°10'N, 120°34'E), 23.V.1979, coll. Yaoquan Li, Yingshu Xie & Shiyang Xia.

Distribution. China (Guangdong).

Etymology. The type location Mt. Dinghu (Guangdong, China) is given as the specific name.



Figure 5. *Tetralonioidella dinghuensis* Niu & Zhu, **sp. nov.**, male. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Mesosoma, dorsal view. f. Metasoma, dorsal view. Scale bars = 1 mm.

***Tetralonioidella emeiensis* Niu & Zhu, sp. nov.** (Figs 7–8)

Diagnosis. The antennae and S7 of the new species is very similar to that of *T. himalayana*, but the pubescent colour-

pattern of scutum is different from *T. himalayana*, apical margin of median process of S8 distinctly concave, and with distinct median hair fringe.

Description. Male. BL 10.5 mm (Fig. 7a); head broader than long, HW:HL=72:56 (Fig. 7b); gena slightly narrower than eye, GW:EW=13:16; width of metasoma slightly broader than the width between the tegulae, MtW:MsW=90:87. Clypeus slightly broader than long (Fig. 7b); apical margin of labrum distinctly concave (Fig. 7c); antenna long, reaching behind margin of tegula, scape conically broadened, as long as F2 to F4 together, flagellomere equal in breadth, F1 as long as broad, F2 long than broad, nearly twice times as long as broad, F3 equal in length with F4, about 1.6 times as long as broad, F5 equal in length with F6, nearly 1.2 times as long as broad, F7–F10 equal in length, nearly as long as broad, F11 hooked apically in lateral view, equal in length with F2, about twice times as long as broad (Fig. 7d); fore wing with distinct numerous papillae apically (Fig. 8a); scutellar spines slender, long, tapering apically, barely visible between pubescence; inner ramus of hind tarsal claw claw-like, arolium present (Fig. 8b); ventral surface of apical part of S7 with dense setae laterally, median part distinctly convex, with thin inconspicuous sparse setae (Fig. 8c); apical margin of median process of S8 distinctly concave, with distinct median hair fringe (Fig. 8d); genitalia as illustrated in Fig. 8e (in dorsal view) and Fig.



Figure 6. *Tetralonioidella dinghuensis* Niu & Zhu, **sp. nov.**, male. a. Fore wing, showing the papillae. b. Claw, showing the inner ramus. c. S7, ventral view. d. S8, ventral view. e. Genitalia, dorsal view. f. Genitalia, lateral view. Scale bars: a, e, f=1 mm; b, c, d=0.5 mm.

8f (in lateral view), basal part of gonostylus with complicated processes at dorsal and ventral side, and the processes with dense long hairs (Fig. 8f). Clypeus black except apical margin yellowish-brown (Fig. 7b); basal half part of mandible yellowish-brown and apical half part dark reddish (Fig. 7c); labrum dark yellowish-brown (Fig. 7c); antenna dark brown beneath (Fig. 7d); tegula yellowish-brown (Fig. 7e); all legs dark reddish-brown except mediotarsus and distitarsus dark yellowish-brown; hind tarsal claw dark yellowish-brown apically (Fig. 8b). Scutum pubescence bicoloured, scutum with narrow, transverse, pale gray pubescent stripe between tegulae (Fig. 7e); clypeus, periphery of antennal socket, supraclypeal area and front surface of scape covered with dense white hairs (Fig. 7b); paraocular area, vertex, genal area, and episternum covered with pale gray hairs, scutum, scutellum, metanotum covered with dense and long gray hairs, intermixed blackish hairs (Fig. 7e); T1–T5 with short, light yellowish-brown hair bands before marginal zones (Figs 7f, 8a).

Female. Unknown.

Material examined. Holotype. ♂, China, Sichuan, Mt. Emei (29°30'N, 103°18'E; elev. 800–1000 m), 20.IV.1957, Hongfu Zhu.

Distribution. China (Sichuan).

Etymology. The type location Mt. Emei (Sichuan, China) is given as the specific name.



Figure 7. *Tetralonioidella emeiensis* Niu & Zhu, **sp. nov.**, male. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Mesosoma, dorsal view. f. Metasoma, dorsal view. Scale bars = 1 mm.



Figure 8. *Tetralonioidella emeiensis* Niu & Zhu, **sp. nov.**, male. a. Fore wing, showing the papillae. b. Claw, showing the inner ramus. c. S7, ventral view. d. S8, ventral view. e. Genitalia, dorsal view. f. Genitalia, lateral view. Scale bars: a, e, f = 1 mm; b, c, d = 0.5 mm.

***Tetralonioidella guomenensis* Niu & Zhu, sp. nov.** (Figs 9–10)

Diagnosis. The new species has the mesosomal terga with yellowish-orange pubescence, similar to *T. pendleburyi*, but all metasomal terga uniformly covered with thin and short yellowish-brown hairs, intermixed with black hairs.

Description. Male. BL 9.0 mm (Fig. 9a); head broader than long, HW:HL = 63:47 (Fig. 9b); gena distinctly narrower than eye, GW:EW = 7:17; width of metasoma slightly broader than the width between the tegulae, MtW:MsW = 74:70. Clypeus broader than long (Fig. 9b); apical margin of labrum nearly straight (Fig. 9c); antenna short, reaching front margin of tegula, scape conically broadened, as long as F1 to F3 together, flagellomere equal in breadth, F1 longer than broad, nearly 1.8 times as long as broad, F2 longer than broad, nearly twice as long as broad, F3 equal in length with F4, about 1.25 times as long as broad, F5–F10 equal in length, nearly as long as broad, F11 rounded apically, equal in length with F2, about twice as long as broad (Fig. 9d); fore wing with distinct numerous papillae apically (Fig. 10a); scutellar spines short and broad, rounded apically, barely visible between pubescence; inner ramus of hind tarsal claw axe-shaped, arolium present (Fig. 10b);

ventral surface of apical part of S7 with dense setae laterally, median part slightly convex with sparse setae (Fig. 10c); apical margin of median process of S8 distinctly concave (Fig. 10d); genitalia as illustrated in Fig. 10e (in dorsal view) and Fig. 10f (in lateral view), basal part of gonostylus with broad blunt triangular process dorsally, and the process with a few long hairs along dorsal margin (Fig. 10f). Clypeus black (Fig. 9b); middle part of mandible dark reddish-brown, basal and apical part of mandible blackish; labrum black (Fig. 9c); antenna dark black beneath (Fig. 9d); tegula yellowish-brown (Fig. 9e); all legs dark reddish-brown; hind tarsal claw dark reddish-brown apically (Fig. 10b). Scutum pubescence yellowish-orange (Figs 9a, e); clypeus, supraclypeal area and periphery of antennal socket covered with white hairs, paraocular area, vertex, genal area, scutum, scutellum, metanotum and episternum covered with dense and long yellowish-orange hairs (Figs 9a–b, d–e); all metasomal terga uniformly covered with thin and short yellowish-brown hairs, intermixed with black hairs (Fig. 9f).

Female. Unknown.

Material examined. Holotype. ♂, China, Yunnan, Xishuangbanna, Mt. Guomen (101°35'E 24°52'N), 13.V.2013, coll. Pia Oremek.

Distribution. China (Yunnan).



Figure 9. *Tetralonioidella guomenensis* Niu & Zhu, **sp. nov.**, male. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Mesosoma, dorsal view. f. Metasoma, dorsal view. Scale bars = 1 mm.

Etymology. The type location Mt. Guomen (Yunnan, China) is given as the specific name.

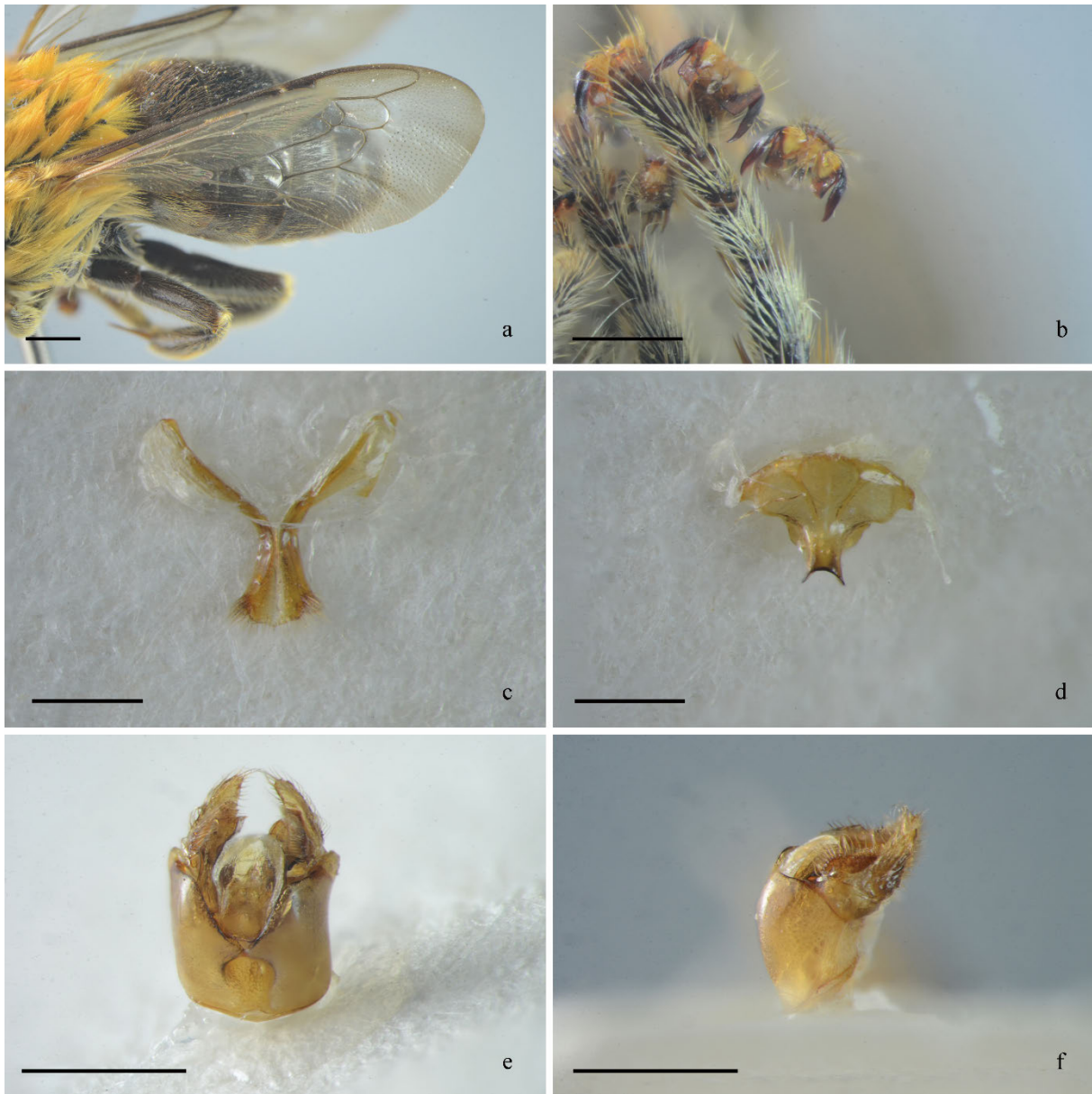


Figure 10. *Tetralonioidella guomenensis* Niu & Zhu, **sp. nov.**, male. a. Fore wing, showing the papillae. b. Claw, showing the inner ramus. c. S7, ventral view. d. S8, ventral view. e. Genitalia, dorsal view. f. Genitalia, lateral view. Scale bars: a, e, f=1 mm; b, c, d=0.5 mm.

***Tetralonioidella leigongensis* Niu & Zhu, sp. nov.** (Figs 11–12)

Diagnosis. The new species can be distinguished from other species of *Tetralonioidella* by its unique shape of S8, its apical margin of median process straight.

Description. Male. BL 9.8 mm (Fig. 11a); head broader than long, HW:HL=57:42 (Fig. 11b); gena distinctly narrower than eye, GW:EW=9:18; width of metasoma as broad as the width between the tegulae, MtW:MsW=66:66. Clypeus broader than long (Fig. 11b); apical margin of labrum slightly concave (Fig. 11c); antenna short, reaching front margin of tegula, scape conically broadened, as long as F1 to F3 together, flagellomere equal in breadth, F1 longer than broad, nearly 1.25 times as long as broad, F2 long than broad, nearly 1.8 times as long as broad, F3 equal in length with F4, about 1.25 times as long as broad, F5-F10 equal in length, nearly as long as broad, F11 rounded apically, equal in length with F2, about 1.8 times as long as broad (Fig. 11d); fore wing with distinct numerous papillae apically (Fig. 12a); scutellar spines slender,

tapering sharp apically, barely visible between pubescence; inner ramus of hind tarsal claw axe-shaped, arolium present (Fig. 12b); ventral surface of apical part of S7 with dense setae laterally, median part slightly convex, nearly bare (Fig. 12c); apical margin of median process of S8 straight (Fig. 12d); genitalia as illustrated in Fig. 12e (in dorsal view) and Fig. 12f (in lateral view), basal part of gonostylus with crescent-shaped process dorsally, and the process with a few long hairs along dorsal margin, another slender belt-shaped projection with a few long hairs at its apex presented outside (Fig. 12f). Clypeus black (Fig. 11b); mandible dark reddish-brown; labrum dark yellowish-brown (Fig. 11c); antenna dark yellowish-brown beneath (Fig. 11d); tegula yellowish-brown (Fig. 11e); all legs dark reddish-brown except mediotarsus and distitarsus dark yellowish-brown; hind tarsal claw blackish-brown apically (Fig. 12b). Scutum pubescence yellowish (Figs 11a, e); clypeus, supraclypeal area covered with white hairs, periphery of antennal socket, paraocular area and front surface of scape covered with yellowish-white hairs (Fig. 11b); vertex, genal area, scutum, scutellum, metanotum and episternum covered with dense and long yellowish hairs (Figs 11a, d–e); all metasomal terga uniformly covered with thin and short yellowish-brown hairs, T2–T5 with obscure apical hair bands (Fig. 11f).

Female. Unknown.

Material examined. Holotype. ♂, China, Guizhou, Leishan, Mt. Leigong (26°24'N, 108°13'E; elev. 1000m), 3. VII.1988,



Figure 11. *Tetralonioidella leigongensis* Niu & Zhu, **sp. nov.**, male. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Mesosoma, dorsal view. f. Metasoma, dorsal view. Scale bars = 1 mm.

coll. Longlong Yang.

Distribution. China (Guizhou).

Etymology. The type location Mt. Leigong (Guizhou, China) is given as the specific name.



Figure 12. *Tetralonioidella leigongensis* Niu & Zhu, **sp. nov.**, male. a. Fore wing, showing the papillae. b. Claw, showing the inner ramus. c. S7, ventral view. d. S8, ventral view. e. Genitalia, dorsal view. f. Genitalia, lateral view. Scale bars: a, e, f = 1 mm; b, c, d = 0.5 mm.

***Tetralonioidella longqiensis* Niu & Zhu, sp. nov.** (Figs 13–15)

Diagnosis. The new species is very similar to *T. fukienensis*, but both sexes apical margin of labrum convex medially.

Description. Male. BL 9.2 mm (Fig. 13a); head broader than long, HW:HL=62:45 (Fig. 13b); gena distinctly narrower than eye, GW:EW=10:16; width of metasoma slightly broader than the width between the tegulae, MtW:MsW=72:70. Clypeus broader than long (Fig. 13b); apical margin of labrum convex medially (Fig. 13c); antenna short, reaching front margin of tegula, scape conically broadened, as long as F1 to F3 together, flagellomere equal in breadth, F1 longer than broad, nearly 1.2 times as long as broad, F2 long than broad, nearly 1.4 times as long as broad, F3 equal in length with F1, about 1.2 times as long as broad, F4–F10 equal in length, nearly as long as broad, F11 rounded apically, equal in length with

F2, about 1.4 times as long as broad (Fig. 13d); fore wing with distinct numerous papillae apically (Fig. 14a); scutellar spines slender, tapering sharp apically, barely visible between pubescence; inner ramus of hind tarsal claw axe-shaped, arolium present (Fig. 14b); ventral surface of apical part of S7 with dense setae laterally, median part straight, with sparse setae (Fig. 14c); apical margin of median process of S8 slightly concave (Fig. 14d); genitalia as illustrated in Fig. 14e (in dorsal view) and Fig. 14f (in lateral view), basal part of gonostylus with blunt triangular process dorsally, and the process with dense long hairs along dorsal margin, another slender belt-shaped projection with long hairs at its apex presented outside (Fig. 14f). Clypeus black (Fig. 13b); mandible dark reddish-brown; labrum blackish-brown (Fig. 13c); antenna dark blackish-brown beneath (Fig. 13d); tegula yellowish-brown (Fig. 13e); all legs dark reddish-brown; hind tarsal claw blackish-brown apically (Fig. 14b). Scutum pubescence yellowish (Figs 5a, e); clypeus, periphery of antennal socket, supraclypeal area, paraocular area and front surface of scape covered with sparse yellowish-white hairs (Fig. 13b); vertex, genal area, scutum, scutellum, metanotum and episternum covered with dense and long yellowish hairs (Figs 13a–b, e); all metasomal terga uniformly covered with thin and short yellowish hairs (Fig. 13f).

Female. BL 10.4 mm (Fig. 15a); head broader than long, HW:HL=62:46 (Fig. 15b); gena distinctly narrower than eye, GW:EW=10:20; width of metasoma slightly broader than the width between the tegulae, MtW:MsW=85:78. Clypeus

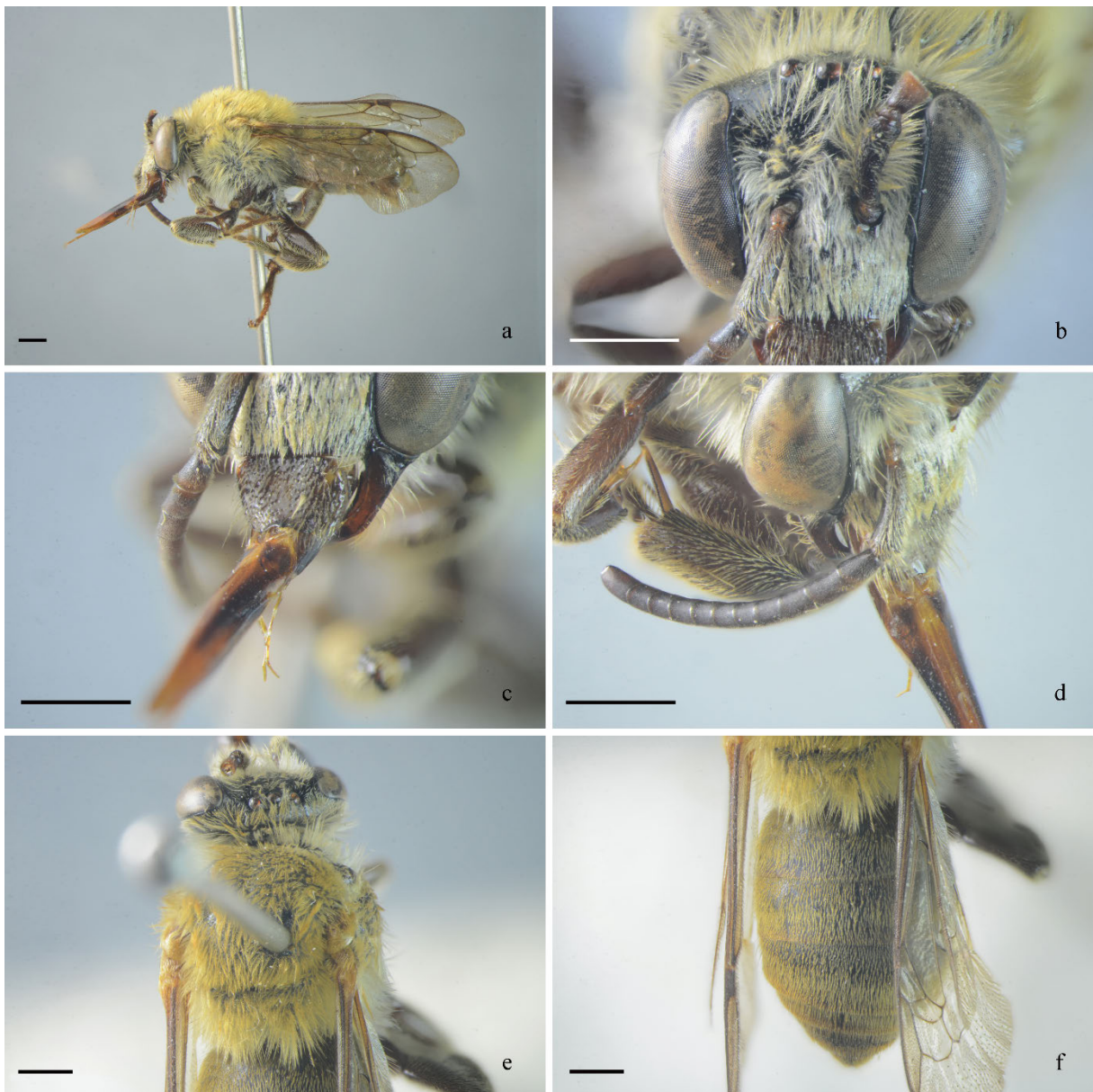


Figure 13. *Tetralonioidella longqiensis* Niu & Zhu, **sp. nov.**, male. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Mesosoma, dorsal view. f. Metasoma, dorsal view. Scale bars = 1 mm.

broader than long (Fig. 15b); apical margin of labrum convex medially (Fig. 15c); antenna short, reaching front margin of tegula, scape conically broadened, as long as F1 and F2 together, flagellomere equal in breadth, F1 slightly longer than broad, nearly 1.2 times as long as broad, F2 long than broad, nearly 1.6 times as long as broad, F3 longer than broad, nearly 1.4 times as long as broad, F4–F9 equal in length, about 1.2 times as long as broad, F10 rounded apically, equal in length with F3, about 1.4 times as long as broad (Fig. 15d); fore wing with distinct numerous papillae apically (Fig. 15e); scutellar spines slender, tapering sharp apically, barely visible between pubescence; inner ramus of hind tarsal claw claw-like, arolium present (Fig. 15h). Clypeus black (Fig. 15b); labrum black (Fig. 15c); antenna dark blackish-brown beneath (Fig. 15d); tegula yellowish-brown (Fig. 15f); all legs dark reddish-brown except mediotarsus and distitarsus dark yellowish-brown. Scutum pubescence yellowish-brown (Figs 15a, f); clypeus covered short pale white hairs, periphery of antennal socket, supraclypeal area, paraocular area and front surface of scape covered long yellowish-white hairs (Fig. 15b); vertex, scutum, scutellum, metanotum covered with yellowish-brown hairs (Figs 15a, d, f); dorsal half part of genal area covered with yellowish-brown hairs, ventral half part covert yellowish-white hairs, episternum covered yellowish-brown hairs (Fig. 4a); all metasomal terga uniformly covered with short, yellowish-brown hairs (Fig. 15g).



Figure 14. *Tetralonioidella longqiensis* Niu & Zhu, **sp. nov.**, male. a. Fore wing, showing the papillae. b. Claw, showing the inner ramus. c. S7, ventral view. d. S8, ventral view. e. Genitalia, dorsal view. f. Genitalia, lateral view. Scale bars: a, e, f = 1 mm; b, c, d = 0.5 mm.

Material examined. Holotype. ♂, China, Fujian, Mt. Longqi (26°44'N, 117°24'E; elev. 850 m), 26.VI.1991, coll. Xingjian Wang. Paratype. 1♀, same locality as holotype, 25.VI.1991, coll. Longlong Yang.



Figure 15. *Tetralonioidella longqiensis* Niu & Zhu, **sp. nov.**, female. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Fore wing, showing the papillae. f. Mesosoma, dorsal view. g. Metasoma, dorsal view. h. Claw, showing the inner ramus. Scale bars: a, b, c, d, e, f, g = 1 mm; h = 0.5 mm.

Distribution. China (Fujian).

Etymology. The type location Mt. Longqi (Fujian, China) is given as the specific name.

***Tetralonioidella maniwengensis* Niu & Zhu, sp. nov.** (Figs 16–17)

Diagnosis. Apical margin of labrum slightly concave, similar to male of *T. fukienensis* and *T. insidiosa*, but they can be distinguished by the different S7, S8 and genitalia.

Description. Male. BL = 10.1 mm (Fig. 16a); head broader than long, HW : HL = 64 : 47 (Fig. 16b); gena distinctly narrower than eye, GW : EW = 9 : 19; width of metasoma slightly broader than the width between the tegulae, MtW : MsW = 76 : 74. Clypeus broader than long (Fig. 16b); apical margin of labrum slightly concave (Fig. 16c); antenna short, reaching front margin of tegula, scape conically broadened, longer than F1 to F3 together, flagellomere equal in breadth, F1 longer than broad, nearly 1.2 times as long as broad, F2 long than broad, nearly 1.5 times as long as broad, F3 longer than broad, nearly 1.2 times as long as broad, F4, F5, F6 and F10 equal in length about 1.1 times as long as broad, F7–F9 equal in length, nearly as long as broad, F11 rounded apically, equal in length with F2, about 1.5 times as long as broad (Fig. 16d); fore wing with



Figure 16. *Tetralonioidella maniwengensis* Niu & Zhu, sp. nov., male. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Mesosoma, dorsal view. f. Metasoma, dorsal view. Scale bars = 1 mm.

distinct numerous papillae apically (Fig. 17a); scutellar spines short and broad, blunt rounded apically, barely visible between pubescence; inner ramus of hind tarsal claw axe-shaped, arolium present (Fig. 16b); ventral surface of apical part of S7 with dense setae laterally, median part slightly concave, with sparse setae (Fig. 17c); apical margin of median process of S8 distinctly concave (Fig. 17d); genitalia as illustrated in Fig. 17e (in dorsal view) and Fig. 17f (in lateral view), basal part of gonostylus with crescent-shaped process dorsally, and the process with dense long hairs along dorsal margin (Fig. 17f). Clypeus black (Fig. 16b); mandible reddish-brown; labrum dark yellowish-brown except apical margin black (Fig. 16c); antenna black beneath (Fig. 16d); tegula yellowish-brown (Fig. 16e); all legs dark reddish-brown; hind tarsal claw black apically (Fig. 17b). Scutum pubescence yellowish (Figs 16a, e); clypeus covered with white hairs, periphery of antennal socket, supraclypeal area, paraocular area and front surface of scape covered with yellowish-white hairs (Fig. 16b); vertex, genal area, scutum, scutellum, metanotum and episternum covered with dense and long yellowish hairs (Figs 16a, e); T1 covered with thin and short yellowish-brown hairs (Fig. 16f), T2-T4 with short, yellowish-white hair bands before marginal zones, and the bands gradually narrowed medially; disc of T2-T4 covered dark yellowish-brown hairs (Figs 16a, f, 17a).

Female. Unknown.

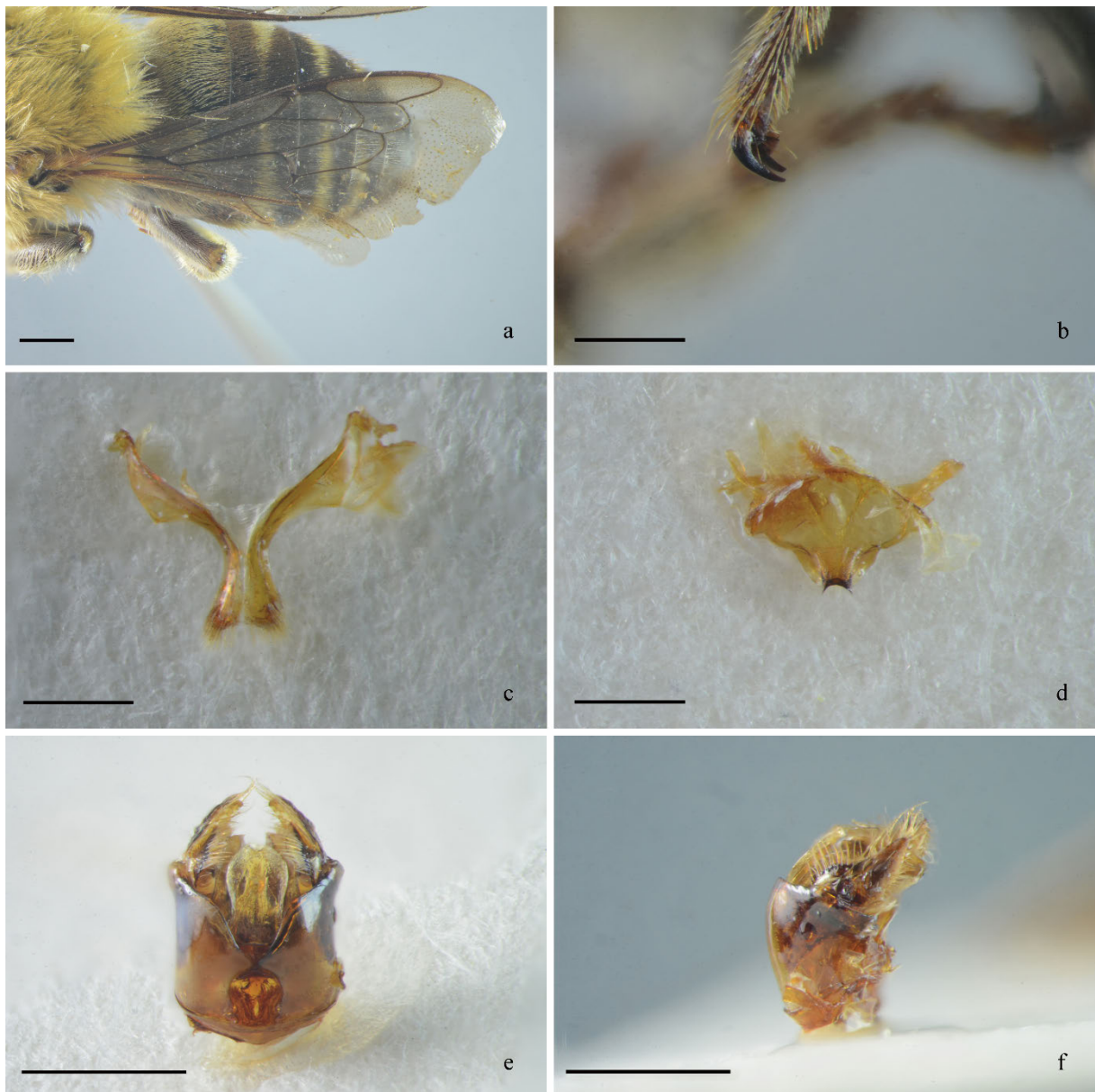


Figure 17. *Tetralonioidella maniwengensis* Niu & Zhu, **sp. nov.**, male. a. Fore wing, showing the papillae. b. Claw, showing the inner ramus. c. S7, ventral view. d. S8, ventral view. e. Genitalia, dorsal view. f. Genitalia, lateral view. Scale bars: a, e, f = 1 mm; b, c, d = 0.5 mm.

Material examined. Holotype. ♂, China, Xizang, Mêdog, Maniweng (28°44'N, 95°01'E; elev. 1050m), 31.VI.1979, coll. Gentao Jin & Jianyi Wu.

Distribution. China (Xizang).

Etymology. The type location Maniweng (Mêdog, Xizang, China) is given as the specific name.

Tetralonioidella tianmuensis Niu & Zhu, *sp. nov.* (Figs 18–19)

Diagnosis. The new species can be distinguished from other species of *Tetralonioidella* by its unique shape of S8, apical margin of median process of S8 concave, and with a projection medially.

Description. Male, BL 9.5 mm (Fig. 18a); head broader than long, HW:HL=66:50 (Fig. 18b); gena distinctly narrower than eye, GW:EW=8:16; width of metasoma slightly broader than the width between the tegulae, MtW:MsW=82:78. Clypeus broader than long (Fig. 18b); apical margin of labrum slightly concave (Fig. 18c); antenna short, reaching front margin of tegulae; scape conically broadened, as long as F1 to F3 together, flagellomere equal in breadth, F1 longer than broad, nearly 1.2 times as long as broad, F2 long than broad, nearly 1.4 times as long as broad, F3 equal in length with F1,



Figure 18. *Tetralonioidella tianmuensis* Niu & Zhu, *sp. nov.*, male. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Mesosoma, dorsal view. f. Metasoma, dorsal view. Scale bars = 1 mm.

about 1.2 times as long as broad, F4–F10 equal in length, nearly as long as broad, F11 rounded apically, equal in length with F2, about 1.4 times as long as broad (Fig. 18d); fore wing with distinct numerous papillae apically (Fig. 19a); scutellar spines short and broad, pointed apically, barely visible between pubescence; inner ramus of hind tarsal claw axe-shaped, arolium present (Fig. 19b); ventral surface of apical part of S7 with dense setae laterally, median part straight, with sparse setae (Fig. 19c); apical margin of median process of S8 slightly concave, with a projection medially (Fig. 19d); genitalia as illustrated in Fig. 19e (in dorsal view) and Fig. 19f (in lateral view), basal part of gonostylus with crescent-shaped process dorsally, and the process with dense long hairs along dorsal margin (Fig. 19f). Clypeus black (Fig. 18b); mandible dark reddish-brown; labrum blackish-brown except apical part yellowish-brown (Fig. 18c); antenna dark blackish-brown beneath (Fig. 18d); tegula yellowish-brown (Fig. 18e); all legs dark reddish-brown; hind tarsal claw blackish-brown apically (Fig. 19b). Scutum pubescence yellowish-white (Figs 18a, e); clypeus, periphery of antennal socket, supraclypeal area, paraocular area and front surface of scape covered with sparse white hairs (Fig. 18b); vertex, genal area, scutum, scutellum, metanotum and episternum covered with dense and long yellowish-white hairs (Figs 18a–b, e); all metasomal terga uniformly covered with thin and short yellowish hairs, and the hairs on T3–T5 denser than that on T1–T2 (Fig. 18f).



Figure 19. *Tetralonioidella tianmuensis* Niu & Zhu, **sp. nov.**, male. a. Fore wing, showing the papillae. b. Claw, showing the inner ramus. c. S7, ventral view. d. S8, ventral view. e. Genitalia, dorsal view. f. Genitalia, lateral view. Scale bars: a, e, f = 1 mm; b, c, d = 0.5 mm.

Female. Unknown.

Material examined. Holotype. ♂, China, Zhejiang, Mt. Tianmu (30°24'N, 119°30'E), 2.IX.1947. Paratype. 1♂, same data as holotype.

Distribution. China (Zhejiang).

Etymology. The type location Mt. Tianmu (Zhejiang, China) is given as the specific name.

***Tetralonioidella wuae* Niu & Zhu, sp. nov.** (Figs 20–22)

Diagnosis. The new species has fore wing without papillae, just as that of *T. heinzi*, but the bristle-like setae on ventral surface S7 of male are denser than that of *T. heinzi*, pubescence on scutum and metasoma sparser than that of *T. heinzi*, yellowish-brown, not fox-red.

Description. Male. BL 9.0–10.2 mm (holotype 10.0 mm) (Fig. 20a); head broader than long, HW:HL=60:43 (Fig. 20b); gena distinctly narrower than eye, GW:EW=10:15; width of metasoma slightly narrower than the width between the tegulae, MtW:MsW=70:72. Clypeus broader than long (Fig. 20b); apical margin of labrum distinctly concave (Fig. 20c); antenna



Figure 20. *Tetralonioidella wuae* Niu & Zhu, sp. nov., male. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Mesosoma, dorsal view. f. Metasoma, dorsal view. Scale bars = 1 mm.

long, reaching behind margin of tegula, scape conically broadened, slightly shorter than F1 to F3 together, flagellomere equal in breadth, F1 as long as broad, F2-F4 equal in length and long than broad, nearly 1.4 times as long as broad, F5-F10 equal in length, nearly 1.2 times as long as broad, F11 rounded apically, equal in length with F2, about 1.4 times as long as broad (Fig. 20d); fore wing with numerous minute hairs apically, distinct papillae absent (Fig. 21a); scutellar spines broad and short, rounded apically, barely visible between pubescence; inner ramus of hind tarsal claw axe-shaped, arolium present (Fig. 21b); apical part of S7 triangular, with small incision at apex, ventral surface of apical part of S7 with stiff, short to long dense setae laterally (Fig. 21c); apical margin of median process of S8 distinctly concave (Fig. 21d); genitalia as illustrated in Fig. 21e (in dorsal view) and Fig. 21f (in lateral view), basal part of gonostylus with broad rectangular process dorsally, and the process with dense long hairs along dorsal and apical margin, penis valve without rectangular processes laterally (Fig. 21f). Clypeus black (Fig. 20b); basal part of mandible black, middle part of mandible dark blackish-brown, apical part of mandible dark reddish-brown; labrum black (Fig. 20c); antenna dark blackish-brown beneath (Fig. 20d); tegula yellowish-brown (Fig. 20e); all legs dark reddish-brown except mediotarsus and distitarsus dark yellowish-brown; hind tarsal claw blackish-brown apically (Fig. 21b). Scutum pubescence yellowish-brown (Figs 20a, e); clypeus, periphery of



Figure 21. *Tetralonioidella wuae* Niu & Zhu, **sp. nov.**, male. a. Fore wing, showing the minute hairs. b. Claw, showing the inner ramus. c. S7, ventral view. d. S8, ventral view. e. Genitalia, dorsal view. f. Genitalia, lateral view. Scale bars: a, e, f=1 mm; b, c, d=0.5 mm.

antennal socket, supraclypeal area, paraocular area and front surface of scape covered with sparse yellowish-white hairs (Fig. 20b); vertex, genal area, scutum, scutellum, metanotum and episternum covered with dense and long yellowish-brown hairs



Figure 22. *Tetralonioidella wuae* Niu & Zhu, **sp. nov.**, female. a. Body, lateral view. b. Head, frontal view. c. Labrum, frontal view. d. Antenna. e. Fore wing, showing the minute hairs. f. Mesosoma, dorsal view. g. Metasoma, dorsal view. h. Claw, showing the inner ramus. Scale bars. a, b, c, d, e, f, g = 1 mm; h = 0.5 mm.

(Figs 20a, d–e); all metasomal terga uniformly covered with thin and short yellowish hairs, and T2–T4 with yellowish-white hair bands before marginal zones (Fig. 20f).

Female. BL 11.2 mm (Fig. 22a); head broader than long, HW:HL = 71:50 (Fig. 22b); gena distinctly narrower than eye, GW:EW = 11:20; width of metasoma broader than the width between the tegulae, MtW:MsW = 87:80. Clypeus broader than long (Fig. 22b); apical margin of labrum straight (Fig. 20c); antenna long, reaching behind margin of tegula, scape conically broadened, slightly shorter than T1 to F3 together, flagellomere equal in breadth, F1 slightly longer than broad, nearly 1.2 times as long as broad, F2 long than broad, nearly 1.6 times as long as broad, F3 equal in length with F4, longer than broad, nearly 1.4 times as long as broad, F5–F9 equal in length, about 1.2 times as long as broad, F10 rounded apically, equal in length with F2, about 1.6 times as long as broad (Fig. 22d); fore wing with numerous minute hairs apically, distinct papillae absent (Fig. 22e); scutellar spines short and broad, rounded apically, barely visible between pubescence; inner ramus of hind tarsal claw axe-shaped, arolium present (Fig. 22h). Clypeus black (Fig. 22b); labrum blackish-brown (Fig. 22c); antenna dark black beneath (Fig. 22d); tegula yellowish-brown (Fig. 22f); all legs dark reddish-brown except mediotarsus and distitarsus dark yellowish-brown. Scutum pubescence yellowish-brown (Figs 22a, f); clypeus covered short and sparse yellowish-white hairs, periphery of antennal socket, supraclypeal area, paraocular area and front surface of scape covered long yellowish-white hairs (Fig. 22b); vertex, scutum, scutellum, metanotum covered with yellowish-brown hairs (Figs 22a, f); all metasomal terga uniformly covered with short, yellowish-brown hairs (Fig. 22g).

Material examined. Holotype. ♂, China, Sichuan, Yibin, Mt. Fuxian (28°42'N, 104°38'E; elev. 400–500 m), 31.V.2016, Feng Yuan. Paratypes. 7♂, same data as holotype; 2♂, Hubei, Lichuan, Mt. Xingdou (30°02'N, 109°08'E; elev. 850–900 m), 21–25.VII.1989, coll. Shuyong Wang & Longlong Yang; 1♂, Hubei, Hefeng, Fengshuifeng (29°55'N, 110°12'E; elev. 1100 m), 29.VII.1989, coll. Shuyong Wang; 1♂, Hunan, Guzhang, Gaowangjie (28°40'N, 110°05'E; elev. 460–600 m), 31.VII.1988, coll. Shuyong Wang; 2♂ 3♀, Hunan, Dayong, Zhushitou (29°19'N, 110°12'E; elev. 350–600 m), 19–21.VIII.1988, coll. Longlong Yang; 1♂, Hunan, Shuishun, Forest Farm of Shanmuhe (29°08'N, 109°50'E; elev. 650 m), 5.VIII.1988, coll. Longlong Yang; 1♂, Sichuan, Wan Xian, Wang'erbao (32°43'N, 105°25'E; elev. 1300 m), 15.VII.1993, coll. Shimei Song; 1♂, Guizhou, Shiqian, Jinxing (27°30'N, 108°08'E; elev. 600 m), 21.VII.1988, coll. Longlong Yang; 1♂, Hainan, Qiongzong, Limushan, Binlang Lake (19°11'N, 109°47'E; elev. 562 m), 7.IV.2010, coll. Kuiyan Zhang.

Distribution. China (Hunan, Hubei, Sichuan, Guizhou, Hainan).

Etymology. The specific name is dedicated to Prof. Yanru Wu of Institute of Zoology, Chinese Academy of Sciences for her contributions to bee taxonomy.

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