

A revision of the subtribe *Brulleiina* van Achterberg (Hymenoptera: Braconidae: Helconinae) from China

X. Chen, J. He & C. van Achterberg

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The species of the genera *Brulleia* Szépligeti, 1904, and *Parabrulleia* van Achterberg, 1983, of the subtribe *Brulleiina* van Achterberg (Braconidae: Helconinae) from China are revised and keyed. Ten species are recognized, and all nine *Brulleia* species are new to science.

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Introduction

The members of the subfamily Helconinae Foerster, 1862 (family Braconidae Nees, 1812) of China are largely unknown and only a few species of this subfamily were reported to occur in the country, mainly by authors from outside China. Recently we found a number of species from China belonging to two genera of the subtribe *Brulleiina* van Achterberg, 1983 (of the tribe *Brulleiini* van Achterberg, 1983 of Helconinae): *Parabrulleia* van Achterberg, 1983, and *Brulleia* Szépligeti, 1904. The former genus is a monotypic genus, and established by van Achterberg (1983) for the reception of the type species, *P. shibuensis* (Matsumura, 1912), which is distributed in North China, East China, northern Gulf (Tonkin) and Japan, parasitizing larvae of Cerambycidae (Coleoptera). *Brulleia* is distributed in East Palaearctic, and NE Oriental regions, and New Guinea (van Achterberg, 1983, 1990), and previously contained seven valid species, but none were reported to occur in China. In this paper nine species of this genus are described from the Oriental part of China (south of 30° N), and all of them are new to science. The hosts are largely unknown, but one species, *B. obereae* spec. nov., was reared from the larvae of *Oberea* spec. (Cerambycidae), indicating its close relationship with *Parabrulleia*.

For the terminology used in this paper, see van Achterberg, 1988 (p. 5-11).

Key to the Chinese species of the subtribe Brulleiina van Achterberg

1. Mandibles distinctly angularly bent medially; second metasomal tergite sculptured at least basally; first tergite extensively sculptured posteriorly; length of ovipositor sheath 1.6-1.9 times fore wing; occipital carina evenly curved dorsally; length of hind tibia 2.2-2.4 times hind femur; clypeus (including margin) flattened. (Genus *Parabrulleia* van Achterberg). Northern China, Zhejiang, Fujian and northern Gulf area *P. shibuensis* (Matsumura)
- Mandibles evenly curved; second tergite smooth or sculptured basally; apex of first tergite partly smooth; length of ovipositor sheath 1.2-1.6 times fore wing; occipital carina arched or reduced medio-dorsally; length of hind tibia 1.6-2.0 times hind femur; clypeus more or less convex or margin protruding. (Genus *Brulleia* Szépligeti) 2
2. Maxillary palp with 4 segments, its length 0.5 times height of head; body brownish-yellow; pterostigma reddish-brown. Guangxi *B. flavibasalis* spec. nov.
- Maxillary palp with 5-6 segments, its length 0.7-0.9 times height of head; colour of body and pterostigma variable 3
3. Body yellowish-brown to reddish-brown; maxillary palp with 5 segments, fifth segment longest; vein 1-M of hind wing 0.8-1.5 times vein 1r-m; vein cu-a of hind wing comparatively less inclivous (figs 6, 11, 16) 4
- Body black, second tergite and its surrounding area dark reddish; maxillary palp with 6 segments, fourth segment longest; vein 1-M of hind wing 1.5-2.2 times vein 1r-m; vein cu-a of hind wing strongly inclivous (figs 26, 31) 6
4. Basal half of antenna reddish-yellow or brownish-yellow, apical half black; colour of pterostigma variable 5
- Antenna black with yellowish-white band; pterostigma reddish-yellow to yellowish-brown. Zhejiang, Fujian *B. rubidus* spec. nov.
5. First tergite densely rugose, transversely medially, and its dorsal carinae present extremely basally; second tergite rugulose baso-laterally; temple smooth dorsally, with coarse punctures ventrally; wing membrane dark yellowish-brown; length of vein 3-SR slightly longer than veins 2-SR or r-m; length of femur of hind leg 5.8 times its width. Guangxi *B. luteus* spec. nov.
- First tergite smooth basally and apically, its basal 0.2-0.5 transversely rugose, rest irregularly rugose, dorsal carinae present at most of basal half; second tergite polished; temple punctulate dorsally, rugose-punctate ventrally; wing membrane yellowish-brown; length of vein 3-SR slightly shorter than veins 2-SR or r-m; length of femur of hind leg 8.6 times its width. Sichuan *B. yangi* spec. nov.
6. Second tergite distinctly rugose medially, only apically and laterally smooth; length of first tergite 3.1-3.4 (σ) times its apical width 7
- Second tergite nearly smooth, at most obscurely rugose basally or rugose baso-laterally; length of first tergite 1.9-2.9(σ), 2.1-2.2 (♀) times its apical width 8
7. Length of maxillary palp 0.55 times height of head; vein cu-a of fore wing almost interstitial; apical width of marginal cell of hind wing about 1.8 times minimum width of cell below vein R1; vein 1-M of hind wing about 1.5 times vein 1r-m. Guizhou *B. tenuipetiolata* spec. nov.
- Length of maxillary palp 0.70 times height of head; vein cu-a of fore wing obviously postfurcal; apical width of marginal cell of hind wing about 2.3 times mini-

- Yunnan *B. chaoi* spec. nov.
8. Second tergite smooth, at most obscurely rugulose basally; length of fourth segment of maxillary palp 1.2-1.4 times fifth segment 9
- Second tergite rugose baso-laterally, remainder smooth; length of fourth segment of maxillary palp 1.8 times fifth segment. Fujian *B. auripes* spec. nov.
9. First tergite finely reticulate-rugose, finely longitudinally striate apically, its length 2.1 times its apical width (σ); propodeum punctate baso-laterally, sub-basally finely rugulose; 2-SR:3-SR:r-m = 7:7:7; length of maxillary palp about 0.7 times height of head. Sichuan *B. subtilirugula* spec. nov.
- First tergite mainly transversely punctate-rugose except apically, its length 2.4-2.9 (σ), 2.1-2.2 (φ) times its apical width; propodeum coarsely reticulate except its baso-lateral punctated area; 2-SR:3-SR:r-m = 7:9:8.5; length of maxillary palp about 0.5 times height of head. Jiangxi *B. obereae* spec. nov.

Parabrulleia van Achterberg, 1983

Parabrulleia van Achterberg, 1983: 287.

Type-species: *Doryctes shibuensis* Matsumura, 1912 (original designation).

Diagnosis.— Mandibles distinctly angularly bent medially; maxillary and labial palpi with 4 and 3 segments, respectively; clypeus flat; occipital carina evenly curved, not arched; vertex without distinct medial groove; frons medially distinctly concave; length of hind tibia 2.2-2.4 times hind femur; second tergite sculptured basally.

Distribution.— North China, Zhejiang, Fujian (East China) and northern Gulf area; East Palaearctic and North East Oriental; one species.

Biology.— Parasites of the larvae of Cerambycidae.

Parabrulleia shibuensis (Matsumura, 1912)

Doryctes shibuensis Matsumura, 1912: 151, pl. 52-1.

Brulleia shibuensis; Shenefelt, 1970: 190; Watanabe, 1972: 7, figs 5-6; Chu, 1935: 21; Chu et al., 1978: 62, fig. 74.

Brulleia chinensis Turner, 1918a: 171; Shenefelt, 1970: 190.

Brulleia euphemia Turner, 1918b: 387; Shenefelt, 1970: 190.

Parabrulleia shibuensis; van Achterberg, 1983: 287.

Material.— 1 ♀ (ZAU), "China, Zhejiang, Mt. W. Tianmushan, 30°4' N, 11°9.5' E, 26.vii.1930, Chu Joo-tso"; 1 ♀ (ZAU), "China, Fujian, Chong'an, Sangang, 27°7' N, 117°6' E, 24.vii.1985, Wang Jiashe, no. 884345".

The specimens examined agree with the holotype of *B. chinensis*, but have the following variation: antennal segments 42-45, length of penultimate segment 1.5 times its width; length of eye in dorsal view equal to temple; temple swollen behind eyes; vertex with a fine, weak median carina; vein r-m of fore wing bent, vein cu-a intersti-

tial, 2-SR:3-SR:r-m = 12.0-13.5:13.5:13.5-20.0; apical width of marginal cell of hind wing 1.6-3.0 times minimum width of cell below vein R1; length of first tergite 2.0-2.2 times its apical width; length of ovipositor sheath 1.64-1.70 times fore wing.

Brulleia Szépligeti, 1904

Brulleia Szépligeti, 1904: 150; Shenefelt, 1970: 190; van Achterberg, 1983: 287.

Type-species: *Brulleia melanocephala* Szépligeti, 1904.

Diagnosis.—Mandibles evenly curved; maxillary and labial palpi with 2-6 and 2-3 segments, respectively; face densely reticulate-rugose; clypeus more or less convex or medially depressed; occipital carina arched medio-dorsally or reduced; vertex usually with longitudinal groove; frons weakly concave medially or nearly flat; length of hind tibia 1.6-2.0 times hind femur; second tergite smooth or sculptured basally.

Biology.—*B. obereae* spec. nov. was reared from *Oberea* spec. (Cerambycidae). This is the first host record of a species of this genus.

Distribution.—Zhejiang, Jiangxi, Sichuan, Fujian, Guangxi, Guizhou, Yunnan; East Palaearctic, NE Oriental regions and New Guinea; 16 species.

Note.—Most species have the palpi more or less reduced. Maxillary and labial palpi consist generally of 2-5 and 2-3 segments, respectively (van Achterberg, 1983). In the Chinese species described in this paper, however, the labial palp always have 3 segments, while the number of segments of maxillary palp is variable: in one species (*B. flavibasalis* spec. nov.) consisting of 4 segments, in three species (*B. rubidus* spec. nov., *B. luteus* spec. nov. and *B. yangi* spec. nov.) having 5 segments, and in five species (*B. tenuipetiolata* spec. nov., *B. chaoi* spec. nov., *B. auripes* spec. nov., *B. subtilirugula* spec. nov. and *B. obereae* spec. nov.) consisting of 6 segments.

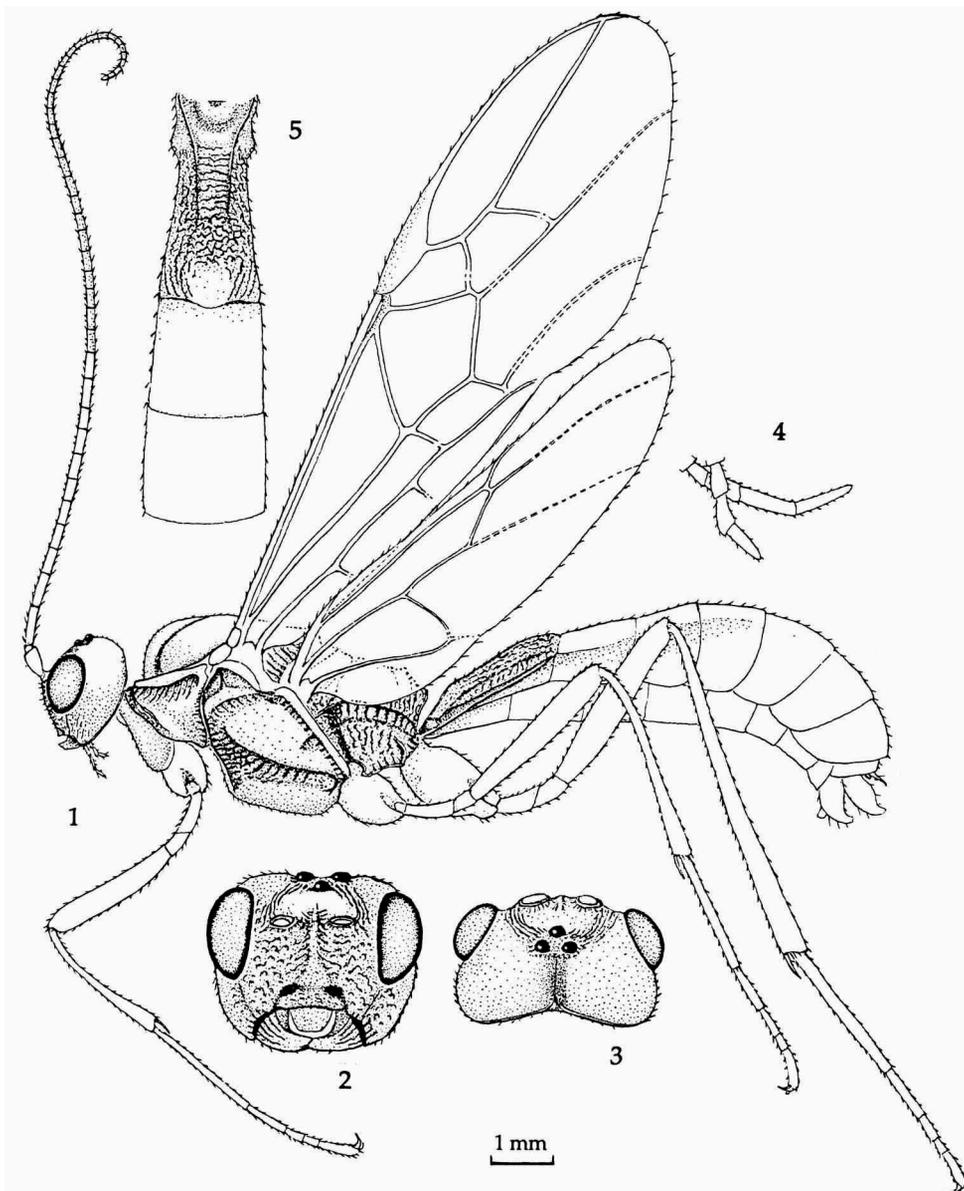
Brulleia flavibasalis He & Chen spec. nov. (figs 1-5)

Material.—Holotype, ♂ (ZAU): "China, Guangxi, Longsheng, 25°.7' N, 110°.0' E, 25.vi.1982, He Junhua, no. 823460".

Holotype, ♂, length of body 20.0 mm, of fore wing 16.4 mm.

Head.—Antennal segments 42, length of third segment 1.1 times fourth segment, length of third, fourth and penultimate segments 4.5, 4.2 and 2.0 times their width, respectively; maxillary and labial palpi with 4 and 3 segments, respectively; length of maxillary palpi 0.5 times height of head; length of eye in dorsal view 1.1 times temple; OOL:OD:POL = 14:4:5; mandibles bent medially; temple rather polished; frons concave medially, with sparse, fine and obsolete punctures laterally; clypeus finely rugose, apical margin slightly concave; labrum truncate apically; malar space obscurely rugose-punctate, its length about as long as basal width of mandible.

Mesosoma.—Length of mesosoma 1.6 times its height; pronope shallow, slit-shaped; side of pronotum antero-medially and subdorsally crenulate, remainder



Figs 1-5, *Brulleia flavibasalis* He & Chen spec. nov., holotype. 1, habitus, lateral aspect; 2, head, frontal aspect; 3, head, dorsal aspect; 4, palpi; 5, first-third metasomal tergites, dorsal aspect. 1: 0.65 × scale-line; 2, 3, 5: 1 ×; 4: 2.6 ×.

rather polished; notauli narrow anteriorly and wide posteriorly, crenulate, posteriorly reticulate and with a medial longitudinal carina; scutellum rather polished; prepectal carina complete, rather weak ventrally; precoxal sulcus complete, rugose-crenulate, posteriorly nearly smooth; propodeum rugose-reticulate, weakly rugose laterally, smooth basally.

Wings.— Fore wing: $r:3-SR:SR1 = 9:11.5:51$; $1-CU1:2-CU1 = 2.5:20$; $2-SR:3-SR:r-m = 14:11.5:15.5$; 2A sclerotized apically. Hind wing: marginal cell slightly widened api-

cally, its apical width 2.1 times the minimum width of cell below vein R1; 1-M:1r-m = 19:14; vein cu-a inclivous, posteriorly arched towards wing base.

Legs.— Length of femur, tibia and basitarsus of hind leg 6.4, 13.6 and 10 times their width, respectively; length of hind tibia 1.9 times hind femur.

Metasoma.— Length of first tergite 2.3 times its apical width, its surface densely rugose, medio-apically polished, dorsal carinae present towards its middle; second tergite quadrate, polished.

Colour.— Brownish-yellow, scutellum, propodeum and first tergite slightly paler; teeth of mandible, apical half of antenna (from basal quarter to apex), area along notauli black; stemmaticum, groove on vertex, spots on mesoscutum light brown; wing membrane yellowish-brown, pterostigma reddish-brown, veins blackish-brown.

Female and host.— Unknown.

Note.— Among the previously described species there are three species, *B. brunnea* van Achterberg, 1983, *B. townesi* van Achterberg, 1983, and *B. nigra* van Achterberg, 1983, which have the same number of segments of palpi as this new species, but only *B. townesi* is similar to this new species in colour. The new species differs from *townesi* by the less slender first metasomal tergite (for a male!), the more slender penultimate antennal segments (fig. 1), the complete prepectal carina, the comparatively longer eye in dorsal view, the less sculptured temple, the comparatively small pronope, and the more slender hind femur.

***Brulleia rubidus* Chen & He spec. nov.**
(figs 6-15)

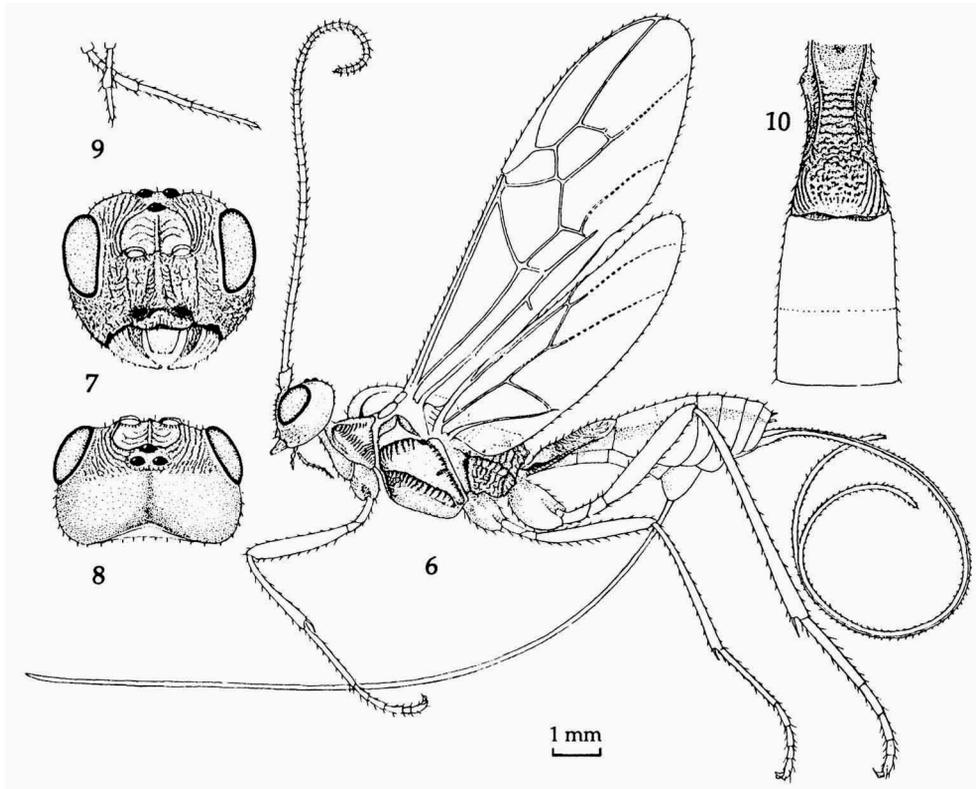
Material.— Holotype, ♀ (SIE), "China, Zhejiang, Mt. W. Tianmu, 30°4' N, 119°5' E, 27.vi, 1936, O. Piel, no. 34016427". Paratype, ♂ (FAC), "China, Fujian, Chong'an, 27°7' N, 118°0' E, 26.vii. 1984, Huang Juchang, no. 881374".

Holotype, ♀, length of body 16.0 mm, of fore wing 15.2 mm.

Head.— Antennal segments 43, length of third segment 1.2 times fourth segment, length of third, fourth and penultimate segments 4.6, 3.7 and 1.3 times their width, respectively; maxillary palp with 5 segments, its length 0.7 times height of head; fourth segment of maxillary palp 0.7 times fifth segment, 0.8 times first-third segments combined; labial palp with 3 segments; length of eye in dorsal view equal to temple; OOL:OD:POL = 12:4.5:5; vertex densely punctate; temple punctate dorsally, densely reticulate ventrally; frons weakly concave, medially with transverse rugae and central carina, laterally with slightly oblique rugae extending to stemmaticum; clypeus convex subapically with a medial notch; labium truncate apically; length of malar space 0.8 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.8 times its height; pronope transverse; side of pronotum crenulate medially, dorsally and posteriorly, remainder punctate; notauli deep and crenulate, with a medial carina posteriorly; scutellum densely punctate, lateral carinae present at basal 0.3; prepectal carina complete, but weakly developed; precoxal sulcus rather wide, crenulate, obscurely reticulate anteriorly; propodeum rather densely rugose, obscurely striate baso-laterally, smooth apico-laterally.

Wings.— Fore wing: r:3-SR:SR1 = 8:12:47; 1-CU1:2-CU1 = 1.8:18; 2-SR:3-SR:r-m =



Figs 6-10, *Brulleia rubidus* Chen & He spec. nov., holotype. 6, habitus, lateral aspect; 7, head, frontal aspect; 8, head, dorsal aspect; 9, palpi; 10, first-third metasomal tergites, dorsal aspect. 6: 0.5 × scale-line; 7, 8, 10: 1 ×; 9: 1.6 ×.

12:12:14; r-m curved below, with a remnant vein; 2A sharp. Hind wing: marginal cell obviously widened apically, its apical width 3.0 times minimum width of cell below vein R1; 1-M:1r-m = 26:21; cu-a inclivous, posteriorly slightly curved towards wing base.

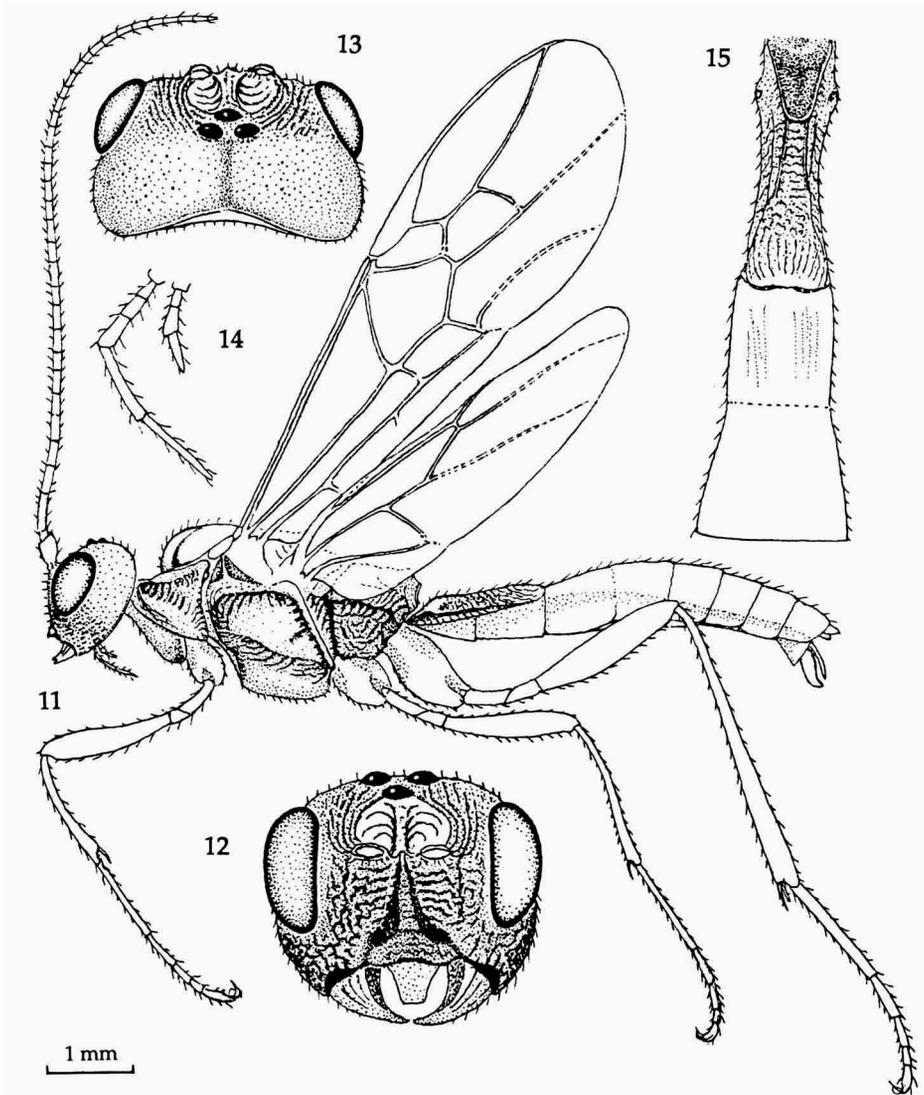
Legs.— Length of femur, tibia and basitarsus of hind leg 5.7, 12.7 and 10.0 times their width, respectively; length of hind tibia 1.9 times hind femur.

Metasoma.— Length of first tergite 1.8 times its apical width, its surface smooth basally and medio-apically, transversely rugose-striate (sub)medially, irregularly rugose subapically, obliquely striate apico-laterally, dorsal carinae obvious at basal 0.4; second tergite smooth; length of ovipositor sheath 1.60 times fore wing.

Colour.— Reddish-brown, notum of mesosoma darker brown; apex of mandible blackish-brown, scapus and pedicel reddish-brown, flagellum blackish-brown, except for yellowish-white 8-15th segments; legs entirely reddish-brown; wing membrane yellowish-brown, pterostigma reddish-brown, veins blackish to light brown.

Paratype, ♂, similar to holotype, but differing as follows: length of body 14.0 mm, of fore wing 12.0 mm.

Head.— Antennal segments 40, length of penultimate segments 2.6 times its width; length of maxillary palp 0.8 times height of head; fourth segment of maxillary



Figs 11-15, *Brulleia rubidus* Chen & He sp. nov., paratype. 11, habitus, lateral aspect; 12, head, frontal aspect; 13, head, dorsal aspect; 14, palpi; 15, first-third metasomal tergites, dorsal aspect. 11: 0.5 × scale-line; 12, 13, 15: 1 ×; 14: 1.6 ×.

palp 0.8 times fifth segment, about equal to length of first-third segments combined; OOL:OD:POL = 9:4:4; malar space longitudinally rugose, its length 0.6 times basal width of mandible.

Wings.— Fore wing: r:3-SR:SR1 = 6.5:10:31; 1-CU1:2-CU1 = 2.0:15.5; 2-SR:3-SR:r-m = 9:10:10. Hind wing: apical width of marginal cell 1.9 times minimum width of cell below vein R1; 1-M:1r-m = 18:21.

Legs.— Length of femur, tibia and basitarsus of hind leg 4.8, 13.3 and 8.8 times their width, respectively.

Metasoma.— Length of first tergite 2.8 times its apical width, its surface deeply

concave basally with obscurely transverse rugae, transversely rugose medially, distinctly obliquely striate apically, dorsal carinae present at basal 0.45, "U"-shaped by joining their apices into each other (fig. 15); second tergite quadrate.

Colour.— Brownish-yellow; 10th-13th antennal segments yellowish-white; fore and middle legs yellow; hind leg and pterostigma yellowish-brown.

Host.— Unknown.

Note.— Very similar to *B. nipponensis* van Achterberg, 1983, but *nipponensis* has the body yellowish-brown, the pterostigma largely dark brown, the length of ovipositor sheath about 1.4 times fore wing, the length of hind tibia 1.6 times hind femur, the length of mesosoma 1.6 times its height and the penultimate segment of antenna of ♀ quadrate.

***Brulleia luteus* He & Chen spec. nov.**
(figs 16-20)

Material.— Holotype, ♂ (ZAU), "China, Guangxi, Tianlin, 24°3' N, 106°2' E, 30.vi.1982, He Junhua, no. 822560".

Holotype, ♂, length of body 16.5 mm, of fore wing 13.5 mm.

Head.— Antennal segments 40, length of third segment 1.2 times fourth segment; length of third, fourth and penultimate segments 4.2, 3.7 and 2.1 times their width, respectively; maxillary palp with 5 segments, its length 0.8 times height of head; fourth segment of maxillary palp equal to fifth segment, 0.8 times length of first-third segments combined; labial palp with 3 segments; length of eye in dorsal view 1.2 times temple; OOL:OD:POL = 11:5:3; temple polished dorsally, gradually densely punctate ventrad; depression along stemmaticum finely crenulate; frons slightly concave, polished near antennal sockets, obliquely striate laterally; clypeus rugose-punctate, apical margin slightly concave; labium truncate apically; malar space rugulose, its length equal to basal width of mandible.

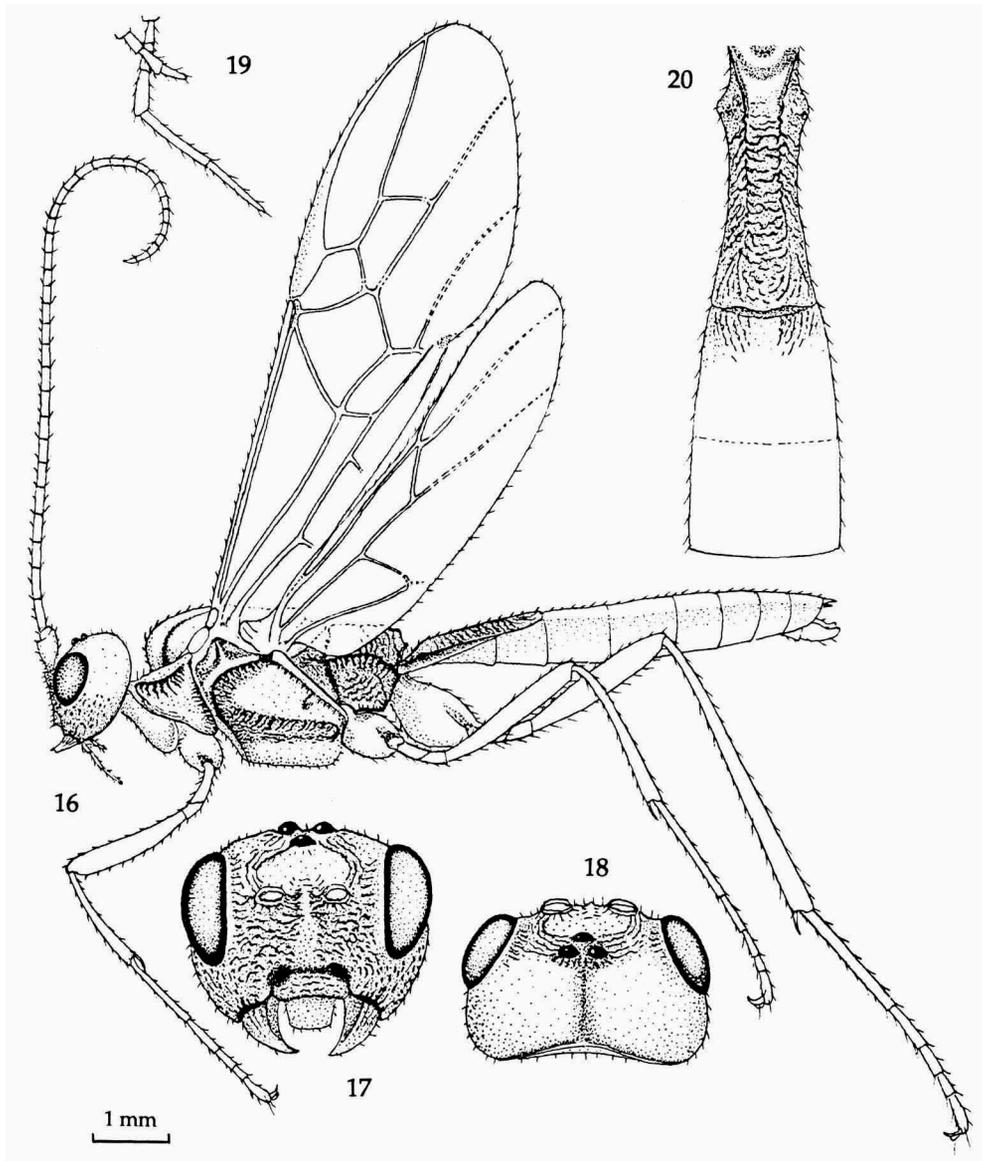
Mesosoma.— Length of mesosoma 1.7 times its height; pronope shallow and wide, slit-shaped; side of pronotum finely punctate, antero-medially and subdorsally crenulate; notauli crenulate, narrow and weak, without a medial carina posteriorly; scutellum trapezoid, finely rugose-punctate posteriorly, coarsely punctate laterally; prepectal carina complete and weak; precoxal sulcus complete, crenulate, somewhat longitudinally rugose ventrally; propodeum reticulate, baso-laterally punctulate.

Wings.— Fore wing: r:3-SR:SR1 = 7:12.5:47; 2-SR:3-SR:r-m = 10.5:12.5:11.5; cu-a interstitial; 2A sharp. Hind wing: apical width of marginal cell twice minimum width of cell below vein R1; 1-M:1r-m = 14:11; cu-a inclivous, posteriorly curved towards wing base.

Legs.— Length of femur, tibia and basitarsus of hind leg 5.8, 13.2 and 11 times their width, respectively; length of hind tibia 1.9 times hind femur.

Metasoma.— Length of first tergite 2.2 times apical width, its surface densely rugose, medially transversely rugose, apico-laterally longitudinally rugose, dorsal carinae present at extreme base, weak; second tergite weakly rugulose baso-laterally.

Colour.— Brownish-yellow; teeth of mandibles, 17th and following segments of antenna black; fourth and its following tergites medially brownish; legs brownish-yellow, joint of trochanter and femur dark brown; wing membrane dark yellowish-



Figs 16-20, *Brulleia luteus* He & Chen spec. nov., holotype. 16, habitus, lateral aspect; 17, head, frontal aspect; 18, head, dorsal aspect; 19, palpi; 20, first-third metasomal tergites, dorsal aspect. 16: 0.5 × scale-line; 17, 18, 20: 1 ×; 19: 1.6 ×.

brown, pterostigma and veins blackish-brown.

Female and host.— Unknown.

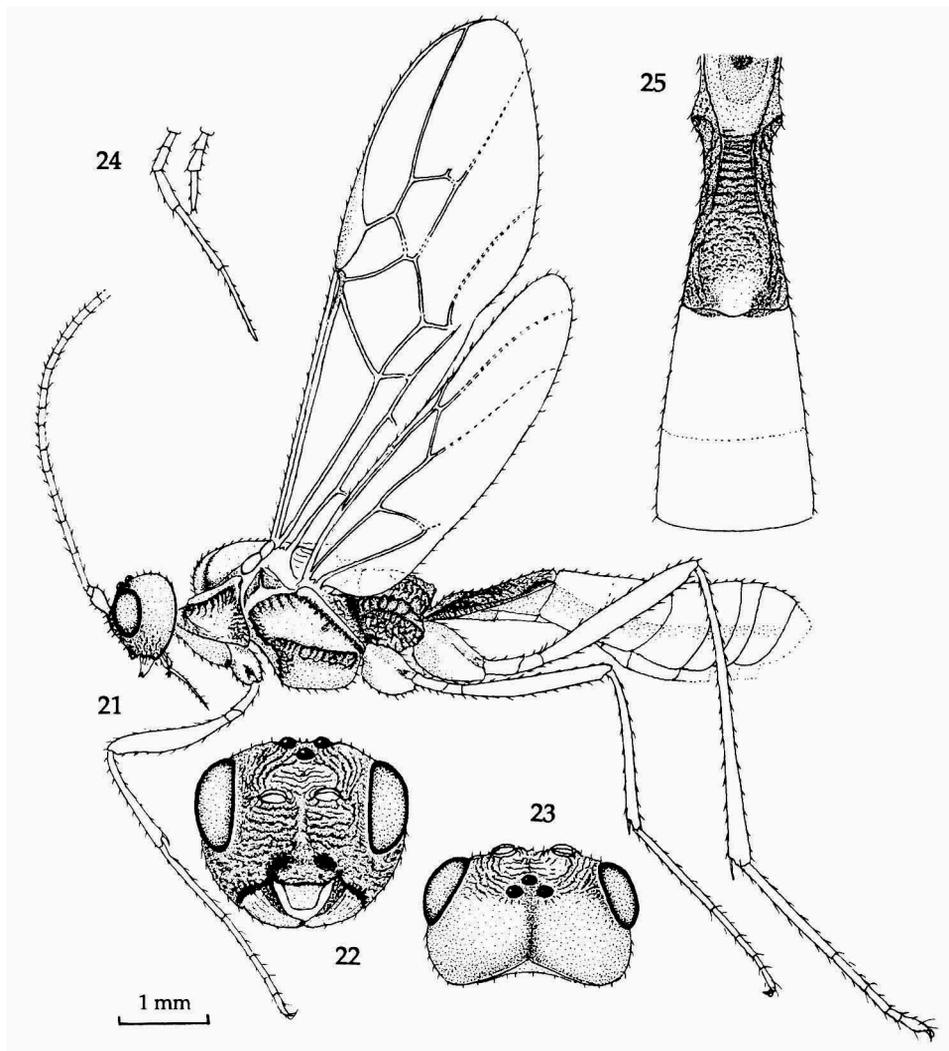
Note.— This new species is similar to *B. nipponensis* van Achterberg, 1983, in ground colour and number of segments of palpi, but can be easily separated from the latter because *luteus* has the antenna without whitish band, the length of hind tibia 1.9 times hind femur, and the second tergite rugulose baso-laterally.

Brulleia yangi He & Chen spec. nov.
(figs 21-25)

Material.— Holotype, ?♂ (BAU), "China, Sichuan, Mt. Emeishan, 29°5' N, 103°3' E, 22.vii.1981, Yang Jikun, no. 871926".

Holotype, ?♂, length of body 16.5(+) mm (metasomal apex missing), of fore wing 14.6 mm.

Head.— Antennal segments 19(+), apical segments missing, length of third segment 1.1 times fourth segment, length of third and fourth segments 5.0 and 4.3 times their width, respectively; maxillary palp with 5 segments, its length 0.9 times height



Figs 21-25, *Brulleia yangi* He & Chen spec. nov., holotype. 21, habitus, lateral aspect; 22, head, frontal aspect; 23, head, dorsal aspect; 24, palpi; 25, first-third metasomal tergites, dorsal aspect. 21: 0.5 × scale-line; 22, 23, 25: 1 ×; 24: 1.6 ×.

of head, length of fourth segment of maxillary palp 0.8 times fifth segment, slightly longer than first-third segments combined; labial palp with 3 segments; length of eye in dorsal view equal to temple; OOL:OD:POL = 11:4.5:4; temple punctulate dorsally, rugose-punctate ventrally; frons slightly concave medially, strongly transversely striate medially, obliquely striate laterally; clypeus reticulate, subapical margin with a central notch; labium truncate apically, slightly convex medially; malar space coarsely rugose, its length equal to basal width of mandible.

Mesosoma.— Length of mesosoma 1.6 times its height; pronope wide, slit-shaped; side of pronotum punctate, antero-medially, subdorsally and posteriorly crenulate; notauli deep, crenulate with a strong medial carina posteriorly; scutellum smooth medially, densely punctate laterally and posteriorly, lateral carinae present at basal 0.6, side of scutellum coarsely, irregularly rugose; prepectal complete and weak; precoxal sulcus complete, wide and shallow, macro-crenulate; propodeum coarsely rugose, weakly and obliquely striate baso-laterally.

Wings.— Fore wing: r:3-SR:SR1 = 8.5:10.7:42; cu-a interstitial; 2-SR:3-SR:r-m = 11:10.7:12; r-m obviously curved, with a remnant vein below middle; 2A sharp. Hind wing: apical width of marginal cell 2.8 times minimum width of cell below vein R1; 1-M:1r-m = 17:11.5; cu-a inclivous, posteriorly bent towards wing base.

Legs.— Length of femur, tibia and basitarsus of hind leg 8.6, 12.8 and 11.3 times their width, respectively; length of hind tibia 1.8 times hind femur.

Metasoma.— Length of first tergite 2.1 times its apical width, its surface smooth basally and medio-apically, basal 0.2-0.45 transversely rugose, rest irregularly rugose, dorsal carinae present at basal 0.45; second tergite polished.

Colour.— Brownish-yellow; apical half of first tergite and its following tergites paler; antenna yellowish-brown, 9th-14th segments yellow; mandibles reddish-brown, apex of teeth black; wing membrane yellowish-brown, pterostigma and veins blackish-brown.

Host.— Unknown.

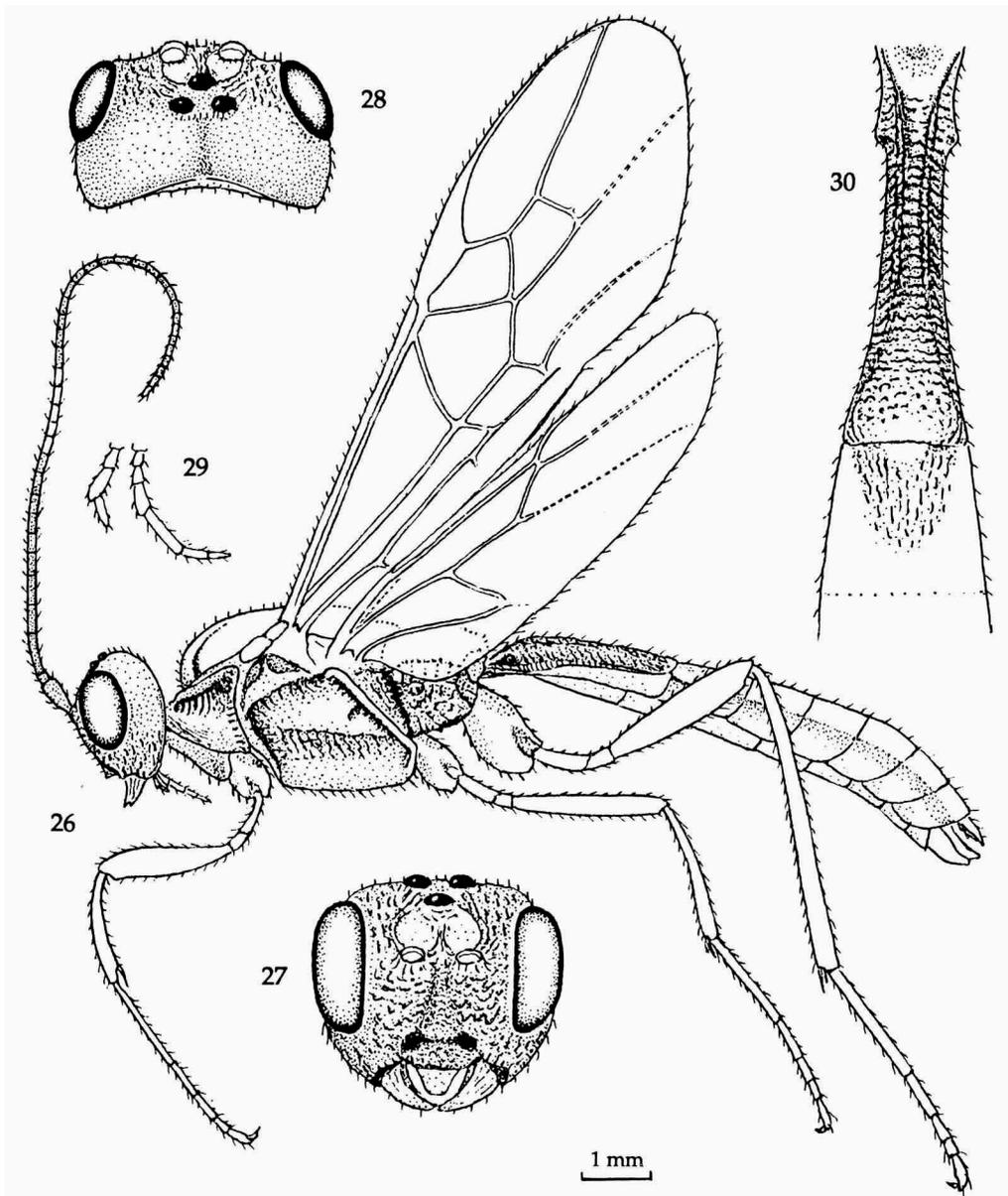
Note.— This new species is also similar to *B. nipponensis* van Achterberg, 1983, in ground colour and number of segments of palpi, but *B. nipponensis* can be readily separated from this new species by the less slender hind femur (about 6 times as long as wide).

***Brulleia tenuipetiolata* Chen & He spec. nov.**
(figs 26-30)

Material.— Holotype, ♂ (ZAU), "China, Guizhou, Bijie, 27°3' N. 105°3' E, 1987, Xu Chuangui, no. 801727".

Holotype, ♂, length of body 12.2 mm, of fore wing 9.0 mm.

Head.— Antennal segments 38, length of third segment 1.3 times fourth segment, length of third, fourth and penultimate segments 3.9, 2.3 and 2.4 times their width, respectively; maxillary palp with 6 segments, its length 0.6 times height of head; length of fourth segment of maxillary palp 1.9 times fifth segment; labial palp with 3 segments; length of eye in dorsal view 1.3 times temple; OOL:OD:POL = 10:5:4; vertex and temple dorsally punctulate, temple ventrally and gena reticulate; frons slightly concave and smooth, medially rugose, laterally obliquely rugose; face and



Figs 26-30, *Brulleia tenuipetiolata* Chen & He spec. nov., holotype. 26, habitus, lateral aspect; 27, head, frontal aspect; 28, head, dorsal aspect; 29, palpi; 30, first-third metasomal tergites, dorsal aspect. 26: 1 × scale-line; 27, 28: 1.6 ×; 29: 2.6 ×; 30: 2 ×.

clypeus reticulate; labium trapezoid, truncate apically, width of its apical margin 0.5 times its basal width; malar space 0.9 times basal width of mandible.

Mesosoma.— Length of mesosoma 1.8 times its height; pronope deep, slit-shaped; side of pronotum medially crenulate, postero-dorsally rugose-punctate, remainder nearly smooth; notauli narrow and deep, crenulate, with a medial carina posteriorly; scutellum smooth anteriorly, with five striae posteriorly; prepectal carina

complete; precoxal sulcus densely punctato-crenulate; propodeum obscurely rugose basally, rest coarsely reticulate.

Wings.— Fore wing: $r:3-SR:SR1 = 6:6:24$; $1-CU1:2-CU1 = 1:17$; $2-SR:3-SR:r-m = 9.5:6:6.5$; 2A sharp. Hind wing: apical width of marginal cell 1.8 times minimum width of cell below vein R1; $1-M:1r-m = 21:14$; cu-a strongly inclivous, posteriorly slightly curved towards wing base.

Legs.— Length of femur, tibia and basitarsus of hind leg 5.3, 12.0 and 10.0 times their width, respectively; length of hind of tibia 1.9 times hind femur.

Metasoma.— Length of first tergite 3.1 times its apical width, spiracles protruding, its tergite sharply narrowed just behind spiracles, the minimum width 0.5 times its apical width; surface of first tergite largely transversely rugose, posteriorly irregularly rugose, dorsal carinae complete, but comparatively weak; second tergite distinctly rugose medially, smooth laterally and apically.

Colour.— Black; apex of first tergite, second tergite sublaterally dark red; first sternite yellow, second-third sternites brownish-yellow; clypeus and mandibles basally reddish-brown; antenna black, scapus and pedicel reddish-brown, 12-16th segments yellowish-white to yellow; legs yellowish-brown, hind coxa and hind femur reddish; wing membrane brown, pterostigma yellowish-brown, vein C+SC+R blackish-brown, other veins light brown to yellowish-brown.

Female and host.— Unknown.

Note.— Similar to *B. auripes* spec. nov., but *auripes* has the pterostigma dark brown, vein 1-M of hind wing twice length of vein 1r-m, the second tergite less sculptured and the first tergite less slender (fig. 40).

***Brulleia chaoi* Chen & He spec. nov.**
(figs 31-35)

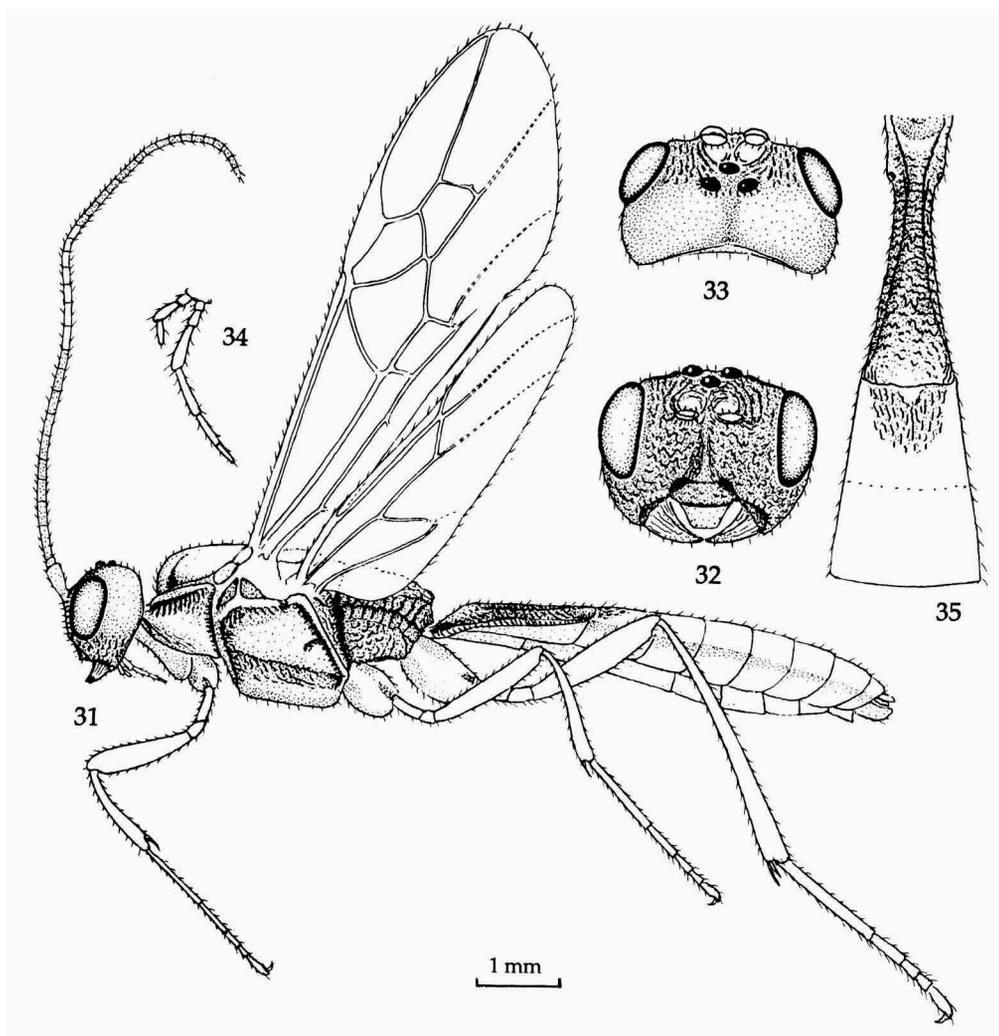
Material.— Holotype, ♂ (FAC), "China, Yunnan, Simao, 22°7' N, 100°9' E, 13.vi.1978, Chao Xiufu, no. 881373".

Holotype, ♂, length of body 13.3 mm, of fore wing 10.1 mm.

Head.— Antennal segments 36, length of third segment 1.3 times fourth segment, length of third, fourth and penultimate segments 3.5, 2.9 and 2.0 times their width, respectively; maxillary palp with 6 segments, its length 0.7 times height of head; length of fourth segment of maxillary palp 1.4 times fifth segment; labial palp with 3 segments; length of eye in dorsal view 1.2 times temple; OOL:OD:POL = 12:6:5.5; frons concave; frons, face and clypeus coarsely rugose; clypeus truncate apically; malar space rugose, its length equal to basal width of mandible.

Mesosoma.— Length of mesosoma 2.1 times its height; pronope transverse; side of pronotum antero-medially, dorsally and posteriorly crenulate, ventrally longitudinally punctate, remainder smooth; notauli narrow and deep, crenulate, with a medial carina posteriorly; scutellum flat, punctulate, shiny, slightly convex posteriorly; precoxal sulcus crenulate; propodeum rugose-punctate baso-laterally, remainder coarsely strongly rugose.

Wings.— Fore wing: $r:3-SR:SR1 = 11.5:11.5:47$; $1-CU1:2-CU1 = 3:17$; $2-SR:3-SR:r-m = 15:11.5:13$; 2A sharp. Hind wing: apical width of marginal cell 2.3 times minimum



Figs 31-35, *Brulleia chaoi* Chen & He spec. nov., holotype. 31, habitus, lateral aspect; 32, head, frontal aspect; 33, head, dorsal aspect; 34, palpi; 35, first-third metasomal tergites, dorsal aspect. 31: 0.6 × scale-line; 32, 33, 35: 1 ×; 34: 1.6 ×.

width of cell below vein R1; 1-M:1r-m = 28:13; cu-a strongly inclivous, almost straight.

Legs.— Length of femur, tibia and basitarsus of hind leg 4.9, 11.4 and 9 times their width, respectively; length of hind tibia 1.9 times hind femur.

Metasoma.— Length of first tergite 3.4 times its apical width, sharply narrowed just behind spiracles, its minimum width 0.5 times its apical width, its surface distinctly coarsely reticulate, dorsal carinae complete but weak, fused with lateral carinae; second tergite obviously obliquely rugose medially, smooth laterally and apically.

Colour.— Black; 12-18th antennal segments yellowish-white; pedicel, mandible (except apex), tegulae, smooth area of second tergite and basal margin of third tergite reddish-brown; first-third sternites, palpi and legs yellow; hind coxa and femur

brownish-yellow; wing membrane slightly brownish; pterostigma, veins C+SC+R and 1-M dark brown, other veins light brown or brown.

Female and host.— Unknown.

***Brulleia auripes* Chen & He spec. nov.**
(figs 36-40)

Material.— Holotype, ♂ (ZAU), "China, Fujian, Mt. Wuyishan, 26°4' N, 116°4' E, 17.vi.1986, Wang Jiashe, no. 870637". Paratype, ♂ (ZAU), topotypic, but 10.vi.1987, and no. 870638.

Holotype, ♂, length of body 16.7 mm, of fore wing 11.9 mm.

Head.— Antennal segments 36, length of third segment 1.2 times fourth segment, length of third, fourth and penultimate segments 4.0, 3.3 and 2.3 times their width, respectively; maxillary palp with 6 segments, its length 0.7 times height of head; length of fourth segment of maxillary palp 1.8 times fifth segment; labial palp with 3 segments; length of eye in dorsal view 1.2 times temple; OOL:OD:POL = 10:5:4; vertex and temple sparsely punctulate dorsally, temple reticulate ventrally; frons slightly concave, medially nearly smooth with some rugae, laterally with slightly oblique striae extending to stemmaticum; face irregularly rugose more strongly than clypeus; clypeus with a medial notch subapically; labium truncate apically; length of malar space 0.7 times basal width of mandible.

Mesosoma.— Length of mesosoma 2.0 times its height; pronope deep, spindle-shaped; side of pronotum medially, dorsally and posteriorly crenulate, ventrally finely striate and punctate; notauli deep, crenulate, with a medial carina posteriorly; scutellum punctulate, lateral carinae absent, side of scutellum crenulate; prepectal carina complete; precoxal sulcus wide and shallow, irregularly reticulate-punctate, anteriorly reticulate, postero-ventrally sparsely longitudinally striate; propodeum weakly punctate basally, remainder irregularly rugose, with a transversely striate, medial pentagonal area.

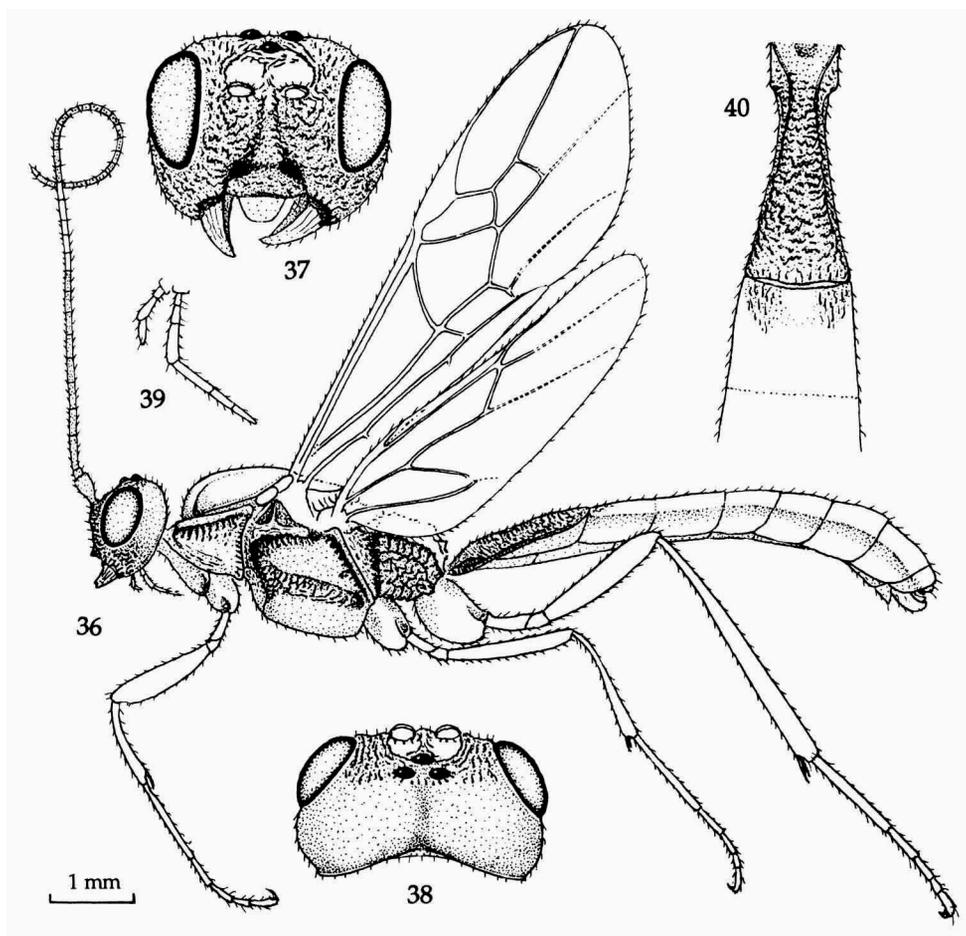
Wings.— Fore wing: r:3-SR:SR1 = 15:15:57; 1-CU1:2-CU1 = 2:26; 2-SR:3-SR:r-m = 15:15:15; 2A sharp. Hind wing: apical width of marginal cell 1.6 times minimum width of cell bellow R1; 1-M:1r-m = 36:18; cu-a strongly inclivous, almost straight.

Legs.— Length of femur, tibia and basitarsus of hind leg 5.2, 12.3 and 9.2 times their width, respectively; length of hind tibia twice length of hind femur.

Metasoma.— Length of first tergite twice its apical width, spiracles protruding, first tergite parallel in front of spiracles, gradually widened towards its apex behind spiracles; its surface evenly but irregularly rugose, dorsal carinae distinct on basal 0.3, transversely rugose between dorsal carinae; second tergite baso-laterally rugose, medially and apically smooth.

Colour.— Black, apex of first tergite, second tergite and basal three-quarter of third tergite reddish-brown; first-third sternites brownish-yellow; clypeus, base of mandibles dark reddish-brown; antenna black, 11-15th segments of flagellum yellowish-white; legs brownish-yellow, hind coxa yellowish-brown, spurs of hind tibia light brown; wing membrane brown, pterostigma and veins blackish-brown.

Female and host.— Unknown.



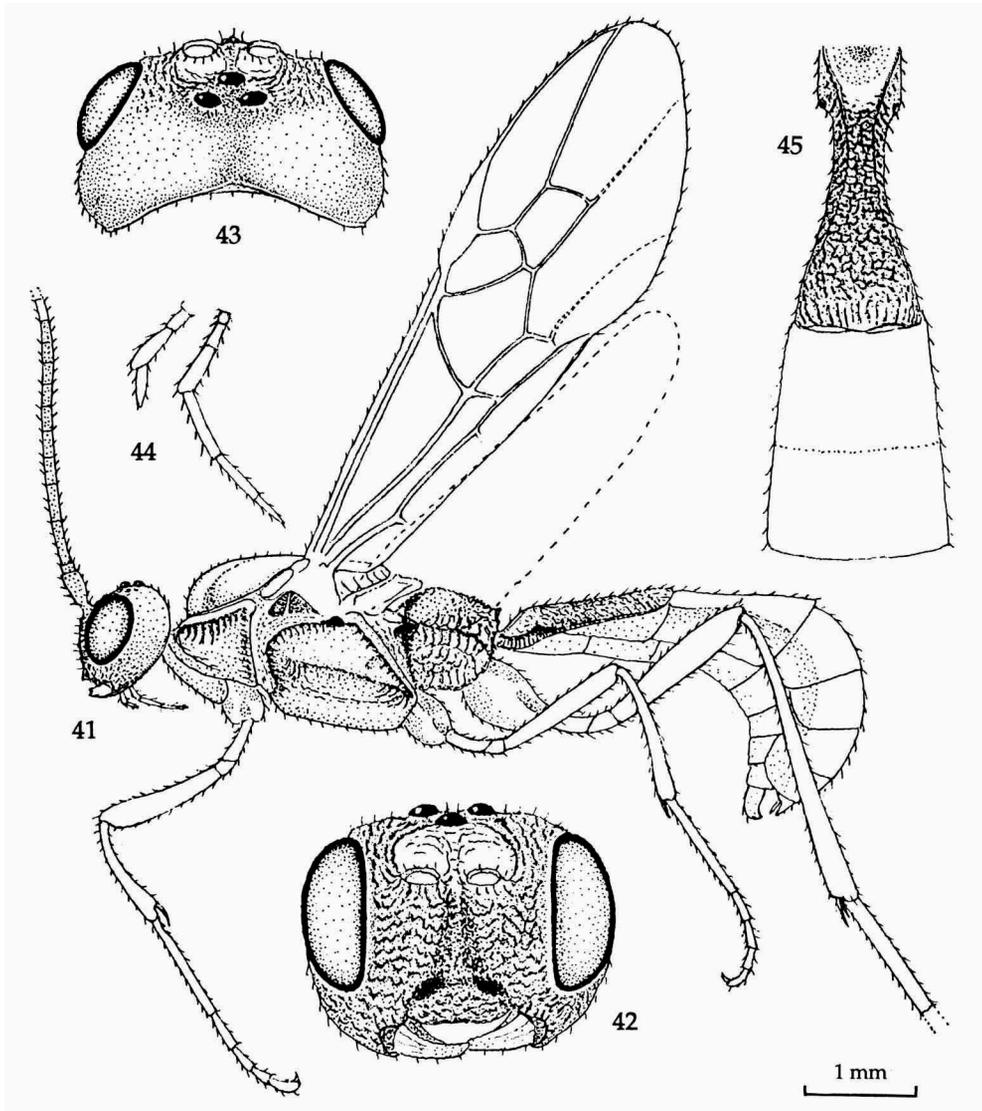
Figs 36-40, *Brulleia auripes* Chen & He spec. nov., holotype. 36, habitus, lateral aspect; 37, head, frontal aspect; 38, head, dorsal aspect; 39, palpi; 40, first-third metasomal tergites, dorsal aspect. 36: 0.5 × scale-line; 37, 38: 1 ×; 39: 1.6 ×; 40: 0.8 ×.

***Brulleia subtilirugula* He & van Achterberg spec. nov.**
(figs 41-45)

Material.— Holotype, ♂ (ZAU), "China, Sichuan, Chongqing, Beibei, 29°8' N, 106°4' E, vii.1978, Zhu Wenbin, no. 801694".

Holotype, ♂, length of body 12.8 mm, of fore wing 9.2 mm.

Head.— Antennal segments 12(+), apical segments missing, length of third segment 1.3 times fourth segment, length of third and fourth segments 4.0 and 3.1 times their width, respectively; maxillary palp with 6 segments, its length 0.7 times height of head; length of fourth segment of maxillary palp 1.2 times fifth segment, twice sixth segment; labial palp with 3 segments; length of eye in dorsal view 1.3 times temple; OOL:OD:POL = 13:7:5; temple shiny, shallowly punctate; frons slightly concave, rugose; face and clypeus obviously finely rugose; clypeus slightly concave



Figs 41-45, *Brulleia subtilirugula* He & van Achterberg spec. nov., holotype. 41, habitus, lateral aspect; 42, head, frontal aspect; 43, head, dorsal aspect; 44, palpi; 45, first-third metasomal tergites, dorsal aspect. 41: 0.5 × scale-line; 42, 43: 1 ×; 44: 1.6 ×; 45: 0.8 ×.

apico-medially; labium truncate apically; malar space rugose, its length about equal to basal width of mandible.

Mesosoma.— Length of mesosoma 1.9 times its height; pronope deep, slit-shaped; side of pronotum antero-medially, subdorsally and posteriorly coarsely crenulate, medially nearly smooth, ventrally finely longitudinally striate; notauli deep and narrow, crenulate, with a medial carina posteriorly; scutellum obscurely punctate, lateral carinae absent; precoxal sulcus largely nearly smooth, anteriorly and posteriorly obscurely crenulate, ventrally longitudinally striate; propodeum

punctulate basally, finely rugulose baso-laterally, remainder coarsely reticulate.

Wings.— Fore wing: r:3-SR:SR1 = 5.5:9:28; cu-a interstitial; 2-SR:3-SR:r-m = 7:9:8.5; 2A sharp. Hind wing: missing.

Legs.— Length of femur, tibia and basitarsus of hind leg 5.1, 11.6 and 9 times their width, respectively; length of hind tibia 1.9 times hind femur.

Metasoma.— Length of first tergite 2.1 times its apical width, its surface with extremely fine reticulate-rugulae, longitudinally striate apically, dorsal carinae gradually fused with rugae behind spiracles; second tergite smooth.

Colour.— Black; lateral lobes of mesoscutum posteriorly, tegulae, apex of first tergite, second tergite, basal half of third tergite reddish-yellow; first-third sternites yellow; labial palp (except base), mandibles basally reddish-brown; maxillary palp yellow; antenna black, scapus and pedicel reddish-brown, 12th(+) antennal segment(s) yellow; legs brownish yellow, hind coxa and femur yellowish-brown; wing membrane brown, vein C+SR+R and pterostigma dark brown, other veins light brown or brown.

Female and host.— Unknown.

***Brulleia obereae* Chen & van Achterberg spec. nov.**
(figs 46-51)

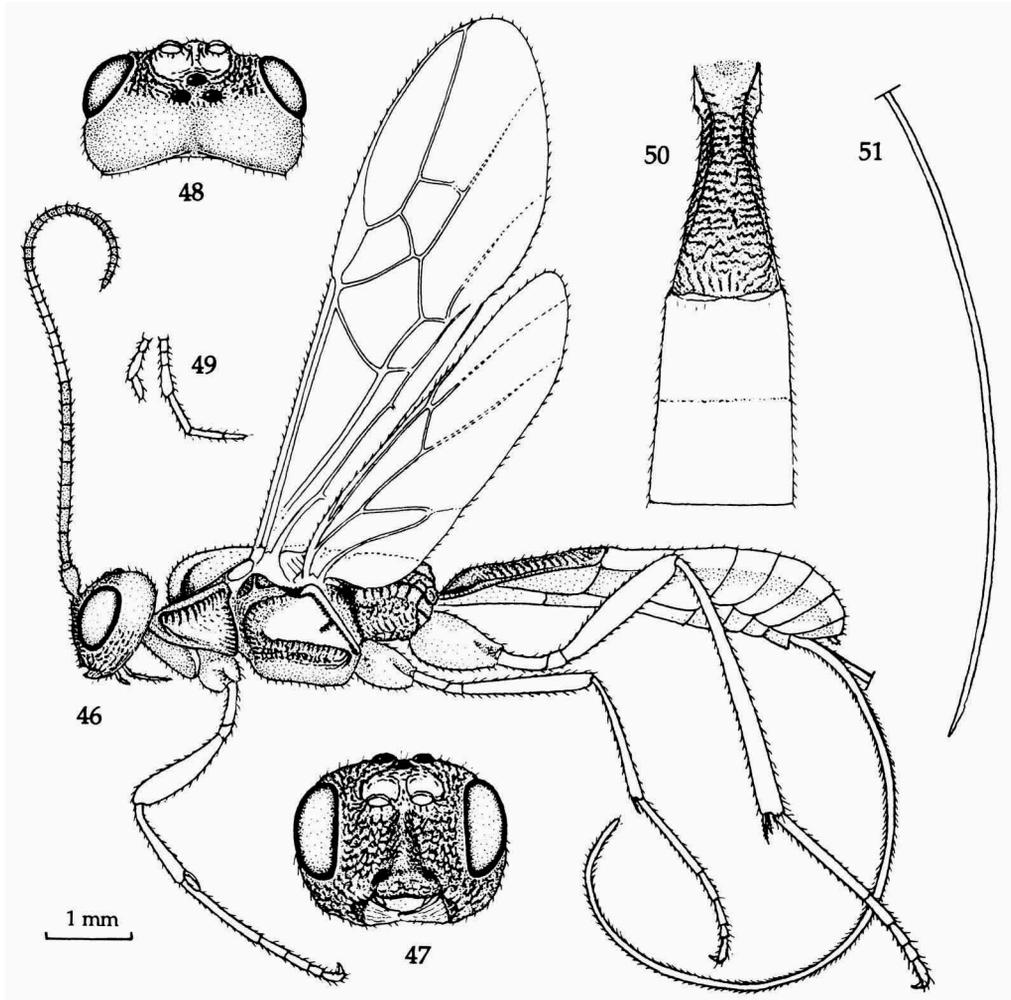
Material.— Holotype, ♀ (ZAU), " China, Jiangxi, Ji'an, 27°0' N, 114°9' E, 15.v.1980, Li Youbang, no. 810352". Paratypes: 7 ♂♂ + 7 ♀♀ (ZAU), 1 ♂ + 1 ♀ (RMNH), same data as holotype.

Holotype, ♀, length of body 11.3 mm, of fore wing 9.2 mm.

Head.— Antennal segments 36, length of third segment 1.2 times fourth segment, length of third, fourth and penultimate segments 3.3, 2.8 and 1.8 times their width, respectively; maxillary palp with 6 segments, its length 0.5 times height of head; length of fourth segment of maxillary palp 1.4 times fifth segment, twice sixth segment; labial palp with 3 segments; length of eye in dorsal view 1.3 times temple; OOL:OD:POL = 7.5:4:3; vertex and temple dorsally sparsely and finely punctulate; temple ventrally rugose; frons slightly concave, smooth, medially with two submedial carinae, laterally with oblique striae extending to stemmaticum; clypeus more finely rugose than face, apex of clypeus truncate; malar space rugose, its length 0.9 times basal width of mandible.

Mesosoma.— Length of mesosoma twice its height; pronope slit-shaped; side of pronotum antero-medially, subdorsally and posteriorly crenulate, ventrally longitudinally striate and punctate, remainder smooth; mesoscutum and scutellum punctulate; notauli narrow and deep, crenulate, posteriorly with a strong (sharp) median carina; scutellum posteriorly with seven short carinae, side of scutellum crenulate; prepectal carina complete, weak, laterally obscure; precoxal sulcus wide and shallow, densely rugose, dorsally more or less crenulate; propodeum baso-laterally smooth, finely punctulate, apico-laterally smooth, remainder coarsely rugose.

Wings.— Fore wing: r:3-SR:SR1 = 11:11:49; 1-CU1:2-CU1 = 1:20; 2-SR:3-SR:r-m = 14:11:13; 2A sharp. Hind wing: apical width of marginal cell 2.7 times minimum width of cell below vein R1; 1-M:1r-m = 26:15; cu-a strongly inclivous, posteriorly bent towards wing base.



Figs 46-51, *Brulleia obereae* Chen & van Achterberg spec. nov., holotype, 46, habitus, lateral aspect; 47, head, frontal aspect; 48, head, dorsal aspect; 49, palpi; 50, first-third metasomal tergites, dorsal aspect; 51, ovipositor. 46, 51: 0.6 × scale-line; 47, 48, 50: 1 ×; 49: 1.6 ×.

Legs.— Length of femur, tibia and basitarsus of hind leg 5.7, 11.3 and 10 times their width, respectively; hind tibia twice as long as hind femur.

Metasoma.— Length of first tergite 2.2 times its apical width; first tergite parallel-sided in front of spiracles, gradually widened towards apex behind spiracles, its surface basally transversely, medially irregularly and apically more or less longitudinally rugose, rugae near its apex weaker, dorsal carinae obvious, posteriorly fused with rugae; second tergite nearly smooth; length of ovipositor sheath 1.4 times fore wing.

Colour.— Black; apex of first tergite, second tergite (except baso-medial triangular area), base of third tergite reddish-yellow; first-third sternites yellow; clypeus apically, mandibles basally reddish-brown; palpi yellowish-brown; 11th-17th antennal segments yellowish-white; legs brownish-yellow, hind coxa and femur darker, hind

tibial spurs reddish brown; wing membrane brown; pterostigma and veins dark brown; veins 1-SR+M, 2-M, 3-M, 2-SR, r-m, 3-SR, SR1 and 1-R1 light brown.

Variation.— Length of body 11.8-12.5 mm, fore wing 8.9-9.2 mm; length of fourth segment of maxillary palp 1.3-1.5 times fifth segment, 1.8-2.0 times sixth segment; r:3-SR:SR1 = 11-12:11-13:49; 1-CU1:2-CU1 = 1.5:18.5-30; 2-SR:3-SR:r-m = 12-14:11:12-13; apical width of marginal cell of hind wing 2.0-2.8 times minimum width of cell below vein R1; 1-M:1r-m = 26:13-15; length of femur, tibia and basitarsus of hind leg 5.1-5.7, 11.3-12.0 and 10.0-10.5 times their width, respectively; length of hind tibia 1.8-2.0 times hind femur; length of first tergite 2.1-2.2 (♀), 2.4-2.9 times (♂) its apical width; first tergite of male more slender, second tergite of male smooth, in some specimens rugulose or rugose baso-medially.

Host: *Oberea* spec. (Cerambycidae).

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