

ORIGINAL ARTICLE

A wingless species of the genus *Hemithyrlocera* Saussure (Blattodea: Ectobiidae) from China

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Abstract A new species, *Hemithyrlocera hemiptera* **sp. nov.**, is described from Southwest China, based on its shortened tegmina, and the lack of hind wings, including the illustrations of its habitus and male genitalia. A key to the Chinese species of the genus is provided. The type material is deposited in Shanghai Entomological Museum (SEM), Chinese Academy of Sciences (CAS).

Key words Blattellinae, *Hemithyrlocera*, cockroach, new species, China.

This paper is a revision of genus *Hemithyrlocera* Saussure, 1893, which contains 72 species worldwide (Beccaloni, 2014, Wang & Che, 2017), including *Plumiger* Hebard, 1929 (Bruijning, 1948), *Moperina* Princis, 1950 (Princis, 1971), *Parasymploce* Hebard, 1929 and *Aristiger* Hebard, 1940 (Roth, 1995) as synonyms. Before this study, only 14 species of this genus are known from China (Princis, 1971; Che *et al.*, 2009; Liu *et al.*, 2017; Wang & Che, 2017).

Shanghai Entomological Museum (SEM) has a rich collection. By examining the specimens, a new species of *Hemithyrlocera* is described based on its shortened tegmina, and the lack of hind wings.

Terminology used in this paper mainly follows Roth (1995, 1999), the nomenclature of wing-venation and male genitalia is according to McKittrick (1964). Measurements are based on Material examined. The examined specimens were dipped in 10% NaOH and anatomized under a Leica ZOOM 2000 microscope. Genital segments of the examined specimens were observed in glycerin jelly using a Leica MZ 125 stereomicroscope. Photographs of the specimens were made with a Canon Olympus E-M5II. All drawings were drawn with Adobe Illustrator CS6®.

The type specimens are deposited in the Shanghai Entomological Museum (SEM), Chinese Academy of Sciences (CAS).

Hemithyrlocera Saussure, 1893

Hemithyrlocera Saussure, 1893: 57.

Plumiger Hebard, 1929: 22, synonymized by Bruijning, 1948: 59.

Parasymploce Hebard, 1929: 69, synonymized by Roth, 1995: 962.

Aristiger Hebard, 1940: 139, synonymized by Roth, 1995: 962.

Moperina Princis, 1950: 218, synonymized by Princis, 1971: 1124.

Type species: *Blatta palliata* Fabricius, 1798, designed by Kirby, 1904.

Generic description. Tegmina and hind wings fully developed extending beyond end of abdomen or curtate, former with a forked radial vein, discoidal veins longitudinal; latter with radial vein forked, CuA simple or with 1–3 complete branches, apical triangle developed. Spines of front femur Type A₂₋₃; pulvilli on 4 proximal tarsomeres, tarsal claws

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symmetrical, simple, arolia present. First abdominal tergum of male unspecialized; seventh abdominal tergum specialized, with a medial depressed region containing setae or sometimes the depression is subobsolete and setae are absent; most species also have a lateral lobe on each side of the segment. Supra-anal plate symmetrical, with a subcercal (intercercal) process ventrally near the base of each cercus. Subgenital plate strongly asymmetrical, hind margin with various shaped processes bearing long spines; styli represented by 1 or 2 large processes, right stylus sometimes presents as a small cylindrical process. Male genitalia have the hook on the left side (L3) and the median phallomere (L2vm) often with a slender rod or filament arising near or beyond the middle.

Distribution. China, India, Nepal, Vietnam, Thailand, Laos, Cambodia, Burma, Philippines, Malaysia, Indonesia, Papua New Guinea.

Key to species of *Hemithysocera* from China.

1. Tegmina and hind wings fully developed extending well beyond end of abdomen 2
Tegmina curtate and hind wings absent..... *H. hemiptera* sp.nov.
2. CuA of hind wings simple or bifurcate..... 3
CuA of hind wings with 2 or 3 branches 6
3. Pronotum with complete yellow border 4
Pronotum with incomplete yellow border 5
4. Tegmina blackish brown with orange yellow radial field; ventral abdomen black; posterior border of abdomen with white border
..... *H. vittata*
Tegmina light brown with hyaline and pale yellowish radial field; ventral abdomen yellowish brown; posterior border of abdomen without white border *H. bifurcata*
5. Lateral and posterior margin of pronotum with yellow border..... *H. fulmeki*
Posterior margin of pronotum with yellow border *H. palliata*
6. Disc of pronotum with markings..... 7
Disc of pronotum without markings..... 10
7. Pronotum without yellow border..... *H. macifera*
Anterior and posterior margin of pronotum with yellow border 8
8. Left lateral side of subgenital plate with fingerlike process *H. forcipata*
Left lateral side of subgenital plate without fingerlike process 9
9. Right stylus of subgenital plate with crooked process..... *H. banvaneuensis*
Right stylus of subgenital plate without crooked process..... *H. simulans*
10. Lateral and posterior margin of pronotum with yellow border..... *H. multicuspidata*
Anterior and posterior margin of pronotum with yellow border 11
11. Seventh tergite with lateral processes..... 12
Seventh tergite without lateral processes 13
12. Supra-anal plate with intercercal processes..... *H. limbata*
Intercercal processes of supra-anal plate absent..... *H. longiseta*
13. Intercercal processes of supra-anal plate without spines *H. marginalis*
Intercercal processes of supra-anal plate with spines *H. spinibarbis*

Hemithysocera hemiptera sp. nov. (Figs 1–5)

Material examined. Holotype ♂, Yuping, Pingbian, Yunnan, China, elev. 2000–2200 m, 21 May 2009, leg. Xianwei Liu *et al.*

Diagnosis. This new species is similar to *H. vittata*, but differs in the shortened tegmina, the absence of hind wings, the shape of supra-anal plate and subgenital plate.

Measurements (mm). Male, overall length including tegmina 10.5; pronotum length × width 3.8 × 2.5; tegmina length 3.0.

Description. Male. Body small. Vertex with interocular space slightly narrower than space between antennal sockets. Pronotum nearly elliptical, median section is the widest and hind margin slightly convex. Tegmina curtate and extending to the third abdominal tergum. Hind wings absent. Spines of front femur is Type A₃. The length of first hind tarsus is approximately the sum of the others; pulvilli on 4 proximal tarsomeres, tarsal claws symmetrical and simple, arolia present. First abdominal tergum unspecialized; seventh abdominal tergum specialized, with setae medially. Supra-anal plate symmetrical, hind margin wide and rounded (Fig. 1). Subgenital plate asymmetrical, lateral margins slightly concave, hind margin convex with spines and setae, one large process arising between the styli, apex spined (Fig. 2). Left stylus larger with apical spines; right stylus smaller with setae. Hook-like phallomere (Fig. 3) long and slender, sclerotized portion small and

preapical hook-like.

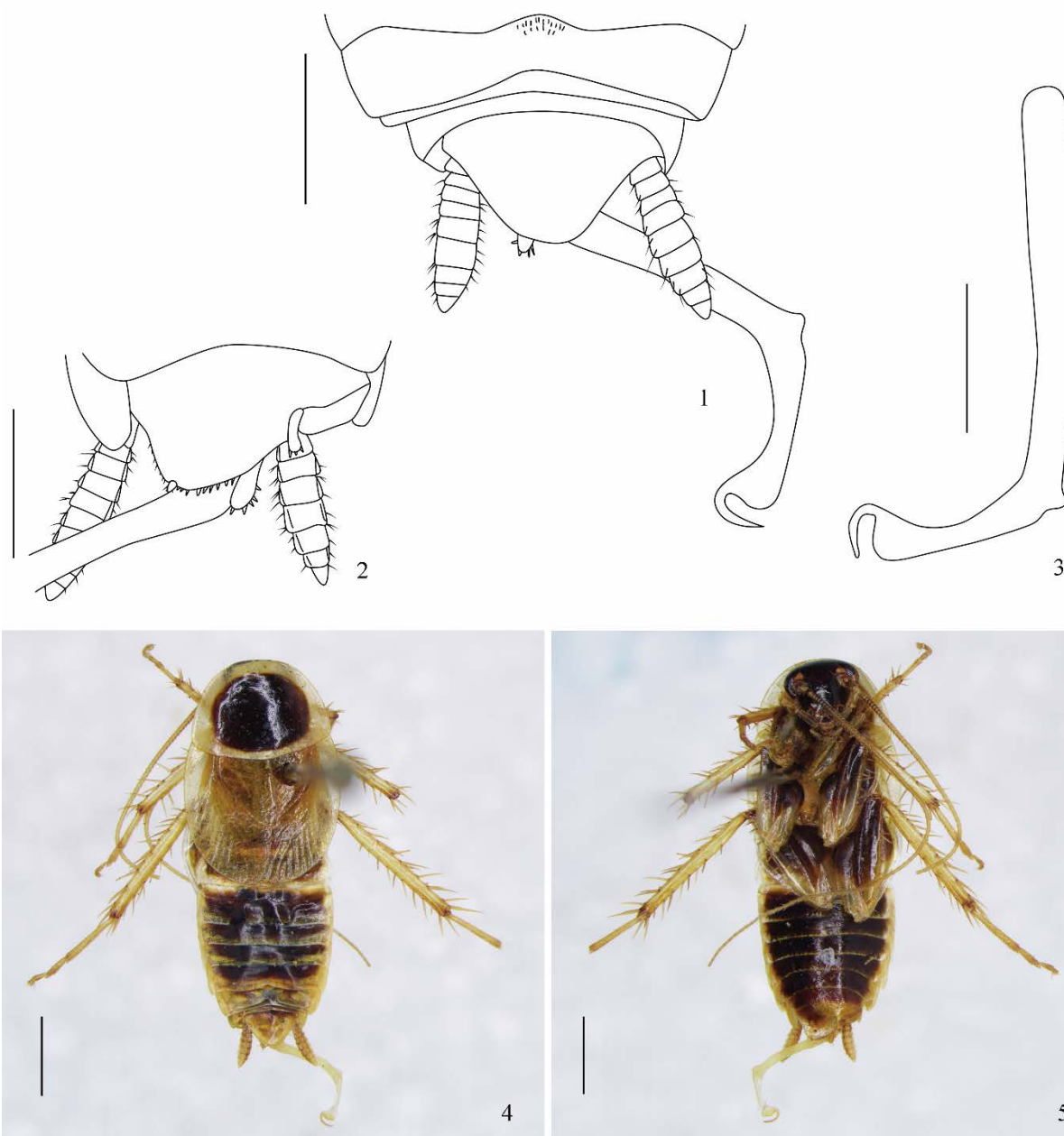
Coloration. Body yellowish brown (Figs 4–5). Vertex dark brown. Ocellar spot pale yellow. Antennae dark brown. Pronotum dark brown with complete yellow border. Tegmina pale brown. Legs brown. Abdominal terga and sterna brown.

Female. Unknown.

Etymology. The specific name *hemiptera* refers to the short tegmina of the new species.

Discussion. The new species is quite different from other species of the genus as its tegmina extending to the third abdominal tergum and the hind wings absent, while other species have the tegmina and the hind wings well developed. Except this, the species fits all features of the genus *Hemithyrsochera*. As a result, we temporarily treated the new species under the genus.

Distribution. China (Yunnan).



Figures 1–5. *Hemithyrsochera hemiptera* **sp. nov.**, holotype, male. 1. Supra-anal plate, dorsal view. 2. Subgenital plate, ventral view. 3. Hook-like phallomere. 4. Habitus, dorsal view. 5. Habitus, ventral view. Scale bars: 1–3 = 1 mm; 4–5 = 2 mm.

***Hemithyrsocera simulans* (Bey-Bienko, 1969)** (Figs 6–7)*Parasymploce simulans* Bey-Bienko, 1969: 856; Rotj, 1985: 527.*Hemithyrsocera simulans* (Bey-Bienko): Roth, 1995: 962.

Diagnosis. This species is similar to *H. macifera*, but differs in the seventh tergite with lateral processes; the pronotum without yellow border.

Measurements (mm). Male, body length (including tegmina) 18.0–18.5; pronotum length \times width 3.0–3.5 \times 4.0–4.5; tegmina length 14.0–14.5. Female, body length (including tegmina) 15.5–16.4; pronotum length \times width 3.0–3.4 \times 4.0–4.3; tegmina length 14.0–14.6.

Material examined. 2♂, Sanchahe, Xishuangbanna, Yunnan, elev. 750m, 9–10 June 2009, leg. Xianwei Liu *et al.*

Distribution. China (Yunnan).

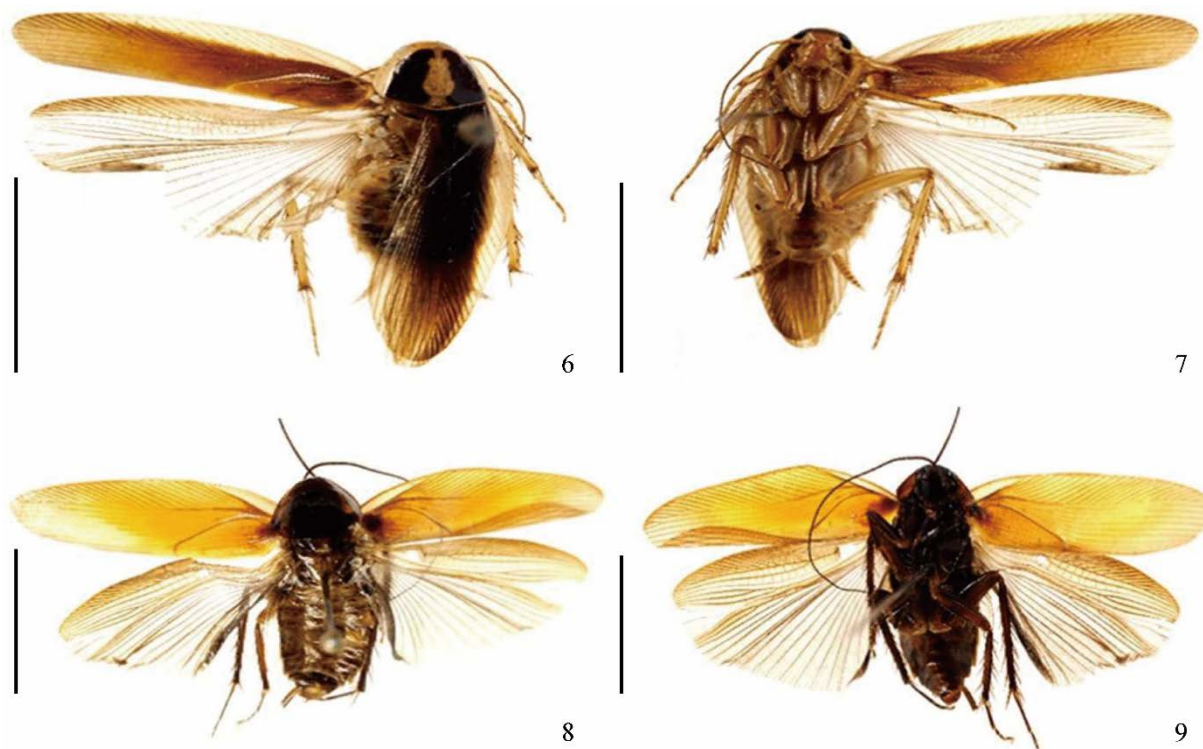
***Hemithyrsocera longiseta* Wang & Che, 2017** (Figs 8–9)*Hemithyrsocera longiseta* Wang & Che, 2017: 552.

Diagnosis. This species is similar to *H. marginalis*, but differs in the seventh tergite with lateral processes; the supra-anal plate without intercercal processes.

Measurements (mm). Male, body length (including tegmina) 17.0; pronotum length \times width 3.5 \times 4.0; tegmina length 14.5. Female, unknown.

Material examined. 1♂, Jianfengling, Hainan, elev. 950–1100m, 26 April 2017, leg. Xianwei Liu *et al.*

Distribution. China (Hainan).



Figures 6–9. Habitus of *Hemithyrsocera* spp., male. 6–7. *H. simulans* (Bey-Bienko, 1969). 8–9. *H. longiseta* Wang & Che, 2017. 6, 8. Dorsal view. 7, 9. Ventral view. Scale bars = 10 mm.

***Hemithyrsocera bifurcata* Che, 2009** (Figs 10–11)*Hemithyrsocera bifurcata* Che In: Che *et al.*, 2009: 747, figs 33–40.

Diagnosis. This species is similar to *H. vittata*, but differs in the tegmina light brown with hyaline and pale yellowish radial field; the ventral abdomen yellowish brown; the posterior border of abdomen without white border.

Measurements (mm). Male, body length (including tegmina) 20.0–21.5; pronotum length \times width 3.0–3.2 \times 3.8–4.0;

tegmina length 18.5–19.0. Female, unknown.

Material examined. 1♂, Wuzhishan, Hainan, 13–15 September 2011, leg. Xianwei Liu *et al.*; 1♂, Diaoluoshan, Lingshui, Hainan, 16–19 September 2011, leg. Xianwei Liu *et al.*

Distribution. China (Hainan).

***Hemithyrlocera marginalis* (Hanitsch, 1933)** (Figs 12–13)

Parasymploce marginalis Hanitsch, 1933: 310.

Hemithyrlocera marginalis (Hanitsch): Roth, 1995: 988.

Diagnosis. This species is similar to *H. longiseta*, but differs in the seventh tergite without lateral processes; the supra-anal plate with distinct intercercal processes.

Measurements (mm). Male, body length (including tegmina) 17.5–19.5; pronotum length × width 3.2–3.8 × 4.5–5.0; tegmina length 14.5–16.0. Female, unknown.

Material examined. 1♂, Bubeng, Xishuangbanna, Yunnan, elev. 600 m, 4–6 June 2009, leg. Xianwei Liu *et al.*; 3♂, Mengla, Yunnan, elev. 650 m, 18 April 1982, leg. Yintao Jin & Jianyi Wu.

Distribution. China (Yunnan, Guangdong), Thailand, Malaysia, Indonesia.

***Hemithyrlocera macifera* (Roth, 1985)** (Figs 14–15)

Parasymploce macifera Roth, 1985b: 524, figs 68–69.

Hemithyrlocera macifera (Roth): Roth, 1995: 962.

Diagnosis. This species is similar to *H. simulans*, but differs in the pronotum without yellow border; the seventh tergite without lateral processes.

Measurements (mm). Male, body length (including tegmina) 18.5–19.0; pronotum length × width 3.2–3.8 × 4.0–5.0; tegmina length 15.0. Female, unknown.

Material examined. 2♂, Jinghong, Yunnan, 31 July–3 August 1995, leg. Xianwei Liu *et al.*; 3♂, Jinuo, Yunnan, 5–9 August 1995, leg. Xianwei Liu *et al.*

Distribution. China (Yunnan, Guangxi), Thailand, Vietnam.

***Hemithyrlocera vittata* (Brunner von Wattenwyl, 1865)** (Figs 16–17)

Thyrlocera vittata Brunner von Wattenwyl, 1865: 119.

Hemithyrlocera vittata (Brunner von Wattenwyl): Princis, 1971: 1125.

Ellipsidium laterale Walker, 1868: 213, synonymized by Princis, 1971: 1126.

Thyrlocera communis Brunner von Wattenwyl, 1893: 23, synonymized by Princis, 1971: 1126.

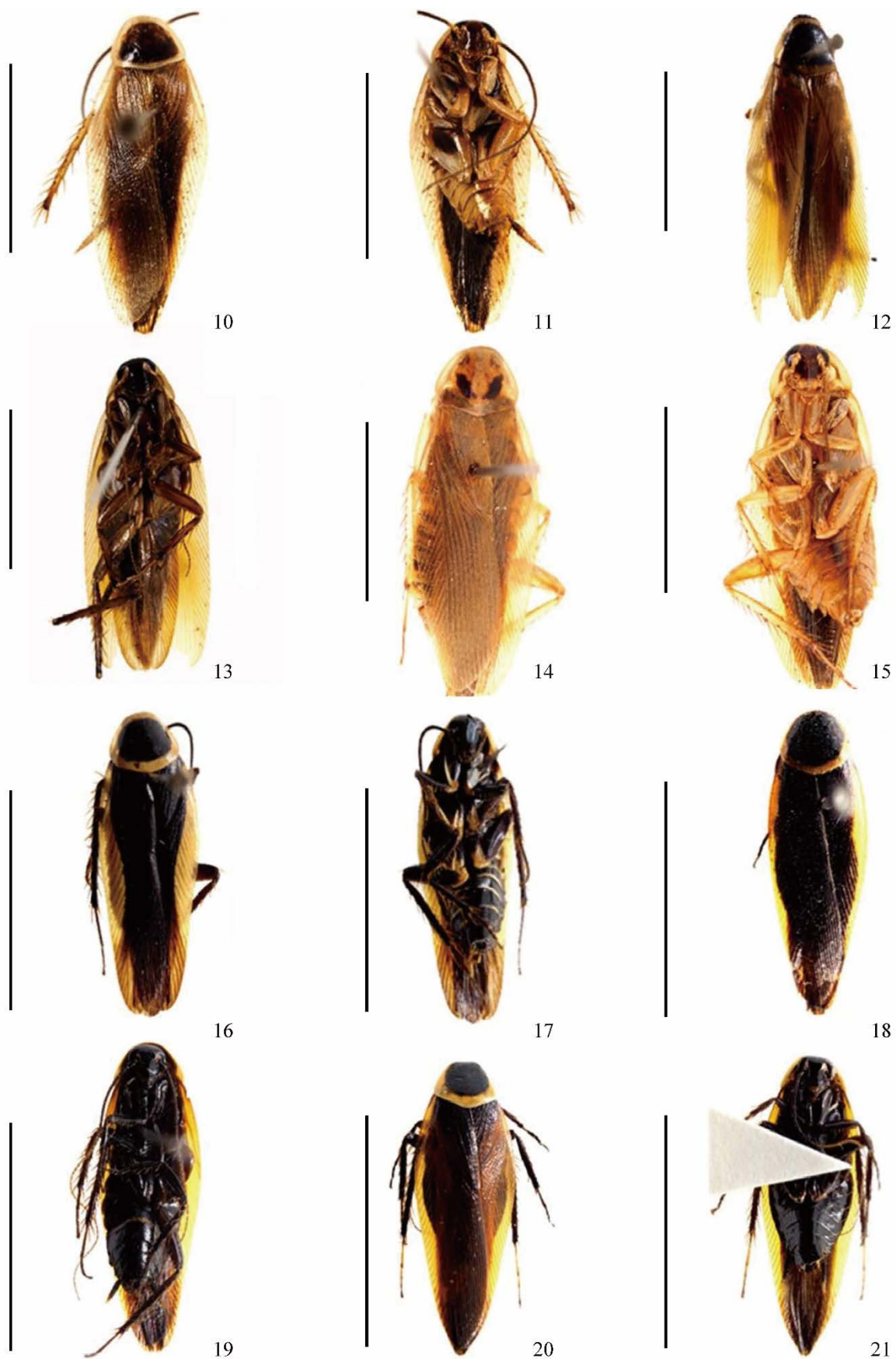
Mopserina communis (Brunner von Wattenwyl): Princis, 1950: 204, 219; Bey-Bienko, 1957: 899.

Diagnosis. This species is similar to *H. bifurcata*, but differs in the tegmina blackish brown with orange yellow radial field; the ventral abdomen black; the posterior border of abdomen with white border.

Measurements (mm). Male, body length (including tegmina) 12.3–14.0; pronotum length × width 2.8–3.3 × 3.5–4.5; tegmina length 11.0–12.0. Female, body length (including tegmina) 11.0–13.0; pronotum length × width 2.8–3.2 × 3.5–4.0; tegmina length 8.5–10.0.

Material examined. 1♂, Rehe, Tengchong, Yunnan, elev. 1368 m, 4 July 2010, leg. Dingjie Zhang; 1♂, Menglun, Xishuangbanna, Yunnan, elev. 600 m, 1–2 June 2009, leg. Xianwei Liu *et al.*; 9♂, Sanchahe, Xishuangbanna, Yunnan, elev. 750 m, 9–10 June 2009, leg. Xianwei Liu *et al.*; 1♂, Menglun, Xishuangbanna, Yunnan, elev. 600 m, 1–2 June 2009, leg. Xianwei Liu *et al.*; 2♂, Wengdang, Mengla, Jinping, Yunnan, elev. 850 m, 26 May 2009, leg. Xianwei Liu *et al.*; 5♂4♀, Mawei, Pingbian, Yunnan, elev. 900–950 m, 22–23 May 2009, leg. Xianwei Liu *et al.*; 4♂, Jinuo, Yunnan, 5–9 August 1995, leg. Xianwei Liu *et al.*; 3♂, Menglun, Yunnan, 18–21 July 1995, leg. Xianwei Liu *et al.*; 1♂, Mengla, Yunnan, 23–27 July 1995, leg. Xianwei Liu *et al.*; 1♂, Sanchahe, Jinghong, Yunnan, 31 July–3 August 1995, leg. Xianwei Liu *et al.*; 5♂, Pingbian, Yunnan, elev. 1300 m, 11 June 1982, leg. Gentao Jin & Jianyi Wu; 8♂, Jinping, Yunnan, elev. 1350 m, 13 July 1982, leg. Gentao Jin & Jianyi Wu; 2♂, Hekou, Yunnan, elev. 100 m, 7 June 1982, leg. Gentao Jin; 1♂, Shiping Daqiao, Yunnan, elev. 1240 m, 24 June 1982, leg. Gentao Jin & Jianyi Wu; 3♂, Pingxiang, Guangxi, 28 February 1963, leg. Yuanzi Chen; 4♂, Xingcun, Chongan, Fujian, 2–4 June 1960, leg. Gentao Jin & Yangming Lin.

Distribution. China (Fujian, Guangxi, Guizhou, Yunnan), Thailand, Myanmar.



Figures 10–21. Habitus of *Hemithysocera* spp., male. 10–11. *H. bifurcata* Che, 2009. 12–13. *H. marginalis* (Hanitisch, 1933). 14–15. *H. macifera* (Roth, 1985). 16–17. *H. vittata* (Brunner von Watterwyl, 1865). 18–19. *H. palliata* (Fabricius, 1798). 20–21. *H. fulmeki* Hanitisch, 1932. 6, 8, 10, 12, 14, 16, 18, 20. Dorsal view. 7, 9, 11, 13, 15, 17, 19, 21. Ventral view. Scale bars=10mm.

***Hemithyrlocera palliata* (Fabricius, 1798)** (Figs 18–19)*Blatta palliata* Fabricius, 1798: 186.*Thyrlocera nigra* Brunner von Wattenwyl, 1865: 120, synonymized by Princis, 1971: 1124.*Ellipsidium subcinctum* Walker, 1868: 85, synonymized by Princis, 1971: 1124.*Ectobia indica* Saussure, 1869: 230, synonymized by Princis, 1971: 1124.*Phyllodromia fuliginosa* Brunner von Wattenwyl, 1893: 16, t. 1, f. 2; Kirby, 1904: 92; Shelford, 1913: 13; Hanitsch, 1927: 35; Princis, 1950: 204.*Hemithyrlocera fuliginosa* (Brunner von Wattenwyl): Shelford, 1913: 66.*Hemithyrlocera palliata* (Fabricius): Shelford, 1913: 661; Wu, 1935: 15; Bey-Bienko, 1954: 3; 1957: 899; 1970: 374.

Diagnosis. This species is similar to *H. fulmeki*, but differs in the posterior margin of pronotum with yellow border; the right lateral side of subgenital plate fanlike, whose base with fingerlike process.

Measurements (mm). Male, body length (including tegmina) 11.0–12.5; pronotum length \times width 2.5×3.3 – 4.0 ; tegmina length 9.0–10.0. Female, body length (including tegmina) 9.0–10.0; pronotum length \times width 2.2 – 3.0×3.5 – 4.0 ; tegmina length 7.5–8.5.

Material examined. 1♀, Redaisuo, Jianfengling, Hainan, 13–18 October 1992, leg. Zurao Liu *et al.*; 1♀, Tongmuguan, Hainan, elev. 970 m, 3 June 1960, leg. Gentao Jin; 5♀, Jianning, Fujian, 6 June 1959, leg. Gentao Jin & Minglin Yang; 10♂5♀, Ninghua, Fujian 14 May 1959, leg. Gentao Jin & Minglin Yang; 4♀, Wuyishan, Fujian, 21 June 1957; 2♀, Yaoshan, Xiuren, Guangxi, 5 June 1938, leg. unknown; 8♀, Jianyang, Fujian, 20 June 1937, leg. unknown.

Distribution. China (Fujian, Hainan, Guangxi), Thailand, Vietnam, Myanmar, India.

***Hemithyrlocera fulmeki* Hanitsch, 1932** (Figs 20–21)*Hemithyrlocera fulmeki* Hanitsch, 1932: 1.*Hemithyrlocera fulmeki* (Hanitsch): Bruijning, 1948: 35, 61; Princis, 1971: 1125.

Diagnosis. This species is similar to *H. palliata*, but differs in the lateral and posterior margin of pronotum with yellow border; the right lateral side of subgenital plate fingerlike, whose base with small processes.

Measurements (mm). Male, body length (including tegmina) 12.0–13.0; pronotum length \times width 2.2 – 2.6×3.6 – 3.8 ; tegmina length 10.0–11.0. Female, body length (including tegmina) 10.5–11.0; pronotum length \times width 3.2 – 3.8×3.5 – 4.0 ; tegmina length 9.0–9.5.

Material examined. 1♂, Guwen, Hunan, 17 September 1988, leg. Xianwei Liu *et al.*; 1♂, Suoxiyu, Cili, Hunan, 4 September 1988, leg. Xianwei Liu *et al.*; 4♀, Hekou, Yunnan, elev. 100 m, 7 June 1982, leg. Gentao Jin; 1♀, Fujian, Nanping, 28 October 1963, leg. Gentao Jin; 1♀, Tonkin Hoa-binh, Vietnam, August 1940, leg. Cooman.

Distribution. China (Hunan, Fujian, Yunnan), Thailand, Vietnam, Indonesia.

Hemithyrlocera banvaneuensis* (Roth, 1985)Parasymploce banvaneuensis* Roth, 1985: 513.*Hemithyrlocera banvaneuensis* Roth, 1995: 962.

Diagnosis. This species is similar to *H. simulans*, but differs in the hind margin of supra-anal plate strongly convex in the middle, posterior region nearly triangular with a few small spines, subgenital plate with one large style-shaped process with apical setae, L2vm distinctly curved and apically tapering, twinned with a long sclerite by membranous cuticle.

Measurements (mm). Male, body length (including tegmina) 17.9–18.5; pronotum length \times width 3.0 – 3.3×4.0 – 4.3 ; tegmina length 15.0–15.3. Female, body length (including tegmina) 16.1–17.0; pronotum length \times width 3.0 – 3.4×4.0 – 4.3 ; tegmina length 14.0–14.9.

Material examined. None.

Distribution. China (Yunnan), Laos.

Hemithyrlocera forcipata* Wang & Che, 2017Hemithyrlocera forcipata* Wang & Che, 2017: 548.

Diagnosis. This species is similar to *H. simulans*, but differs in the right side of subgenital plate distinctly produced into one rounded lobe, two styli arising from the middle of hind margin; hind margin with 3 processes, apex of L2vm rounded, both right and left paraprocts with small spines arising from the middle.

Measurements (mm). Male, body length (including tegmina) 17.5–18.5; pronotum length \times width 3.1 – 3.4×4.1 – 4.4 ;

tegmina length 15.0–15.3. Female, body length (including tegmina) 16.0–17.1; pronotum length \times width 3.1–3.5 \times 4.0–4.3; tegmina length 14.0–15.0.

Material examined. None.

Distribution. China (Yunnan).

***Hemithyrlocera spinibarbis* Wang & Che, 2017**

Hemithyrlocera spinibarbis Wang & Che, 2017: 550.

Diagnosis. This species is similar to *H. longiseta*, but differs in the supra-anal plate with right and left intercercal processes, apices rounded with dense spines, seventh abdominal tergum without lateral lobes, L2vm slender with apex pointed, two accessory sclerites present.

Measurements (mm). Male, body length (including tegmina) 20.5–21.0; pronotum length \times width 4.0 \times 5.0; tegmina length 17.0–17.5. Female, unknown.

Material examined. None.

Distribution. China (Yunnan).

***Hemithyrlocera multicuspidata* Wang, 2009**

Hemithyrlocera multicuspidata Wang, 2009: 748.

Diagnosis. This species is similar to *H. fulmeki*, but differs in cubitus vein of hind wing with 1 incomplete branch, median phallomere stout, near distal portion clubbed, curved and terminal sharpened, subgenital plate complex, with 5 processes directed caudad.

Measurements (mm). Male, body length (including tegmina) 14.5–15.0; pronotum length \times width 3.0 \times 4.0; tegmina length 12.5–14.0. Female, unknown.

Material examined. None.

Distribution. China (Yunnan).

***Hemithyrlocera limbata* Bey-Bienko, 1969**

Parasymploce limbata Bey-Bienko, 1969: 856.

Hemithyrlocera limbata Roth, 1985: 527.

Diagnosis. This species is similar to *H. marginalis*, but differs in cubitus vein of hind wing with 3 branches, 2 rami being the maximum.

Measurements (mm). Male, body length (including tegmina) 17.5–18.0; pronotum length \times width 3.7–4.0 \times 5.0–5.4; tegmina length 14.5–15.0. Female, unknown.

Material examined. None.

Distribution. China (Yunnan).

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