



Four new species of the subgenus *Homoneura* from Yintiaoling Nature Reserve, China (Diptera: Lauxaniidae: *Homoneura*)

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Abstract

The subgenus *Homoneura* Malloch, 1927 is the most diverse in China, with more than 220 known species. Four new species of *Homoneura* (*Homoneura*) *henanensis* group, that is, *Homoneura* (*Homoneura*) *apiconcava* sp. nov., *H. (H.) chongqingensis* sp. nov., *H. (H.) wuxica* sp. nov., and *H. (H.) yintiaolingica* sp. nov., were described from Yintiaoling Nature Reserve, Chongqing, China. A key to the known species of this species group is presented.

Key words: Homoneurinae, *Homoneura* (*Homoneura*) *henanensis* group, new species, Chongqing

Introduction

The subgenus *Homoneura* Malloch, 1927 (Diptera: Lauxaniidae: *Homoneura*) is highly diversified, with more than 700 described species from all zoogeographical regions except the Neotropical region. Among them, more than 220 species were described from China, assigned into 21 species groups (Shi & Yang, 2014). The *Homoneura* (*Homoneura*) *henanensis* group is distinctly different from other species groups by the wing having five brown spots, which are respectively located between the r-m and apical spot on R₄₊₅, crossvein dm-cu and the tips of R₂₊₃, R₄₊₅ and M₁. This species group includes 42 recognized species in China (Kertész 1915, Matsumura 1916, Malloch 1926, Yang, Zhu & Hu 1999, 2003, Yang, Hu & Zhu 2001, Gao & Yang 2002, 2003, 2004, 2005, Wang, Gao & Yang 2012, Papp & Gaimari 2013, Shi & Yang 2014, Shi, Gao & Shen 2017, Gao & Shi 2019, Chen & Li 2022), but no record from Chongqing Municipality.

Yintiaoling National Nature Reserve is located in the northeast of Wuxi County, Chongqing Municipality of China, which is the branch of Shennongjia primeval forest. Total area of the reserve is 22423.1 hectares, with unique geographical location and rich forest resources, providing a good habitat and breeding environment for wild animals. The adults and larvae of lauxaniids are mainly saprophagous or bacteriophagous (Silva & Mello, 2008). The rich humus and fungi in Yintiaoling Reserve are particularly suitable for the breeding and habitat of lauxaniids, but the diversity of lauxaniids in the reserve has never been explored.

In this paper, we report four new species of *Homoneura* (*Homoneura*) *henanensis* group from Yintiaoling Nature Reserve, namely *H. (H.) apiconcava* sp. nov., *H. (H.) chongqingensis* sp. nov., *H. (H.) wuxica* sp. nov., and *H. (H.) yintiaolingica* sp. nov., and a key to species of *Homoneura* (*Homoneura*) *henanensis* group from China is also provided.

Material and methods

General terminology follows Cumming & Wood (2017) and Gaimari & Miller (2021). Genitalia preparations were made by removing and macerating the apical portion of the abdomen in cold saturated NaOH for six hours, then rinsing and neutralizing them with glacial acetic acid for dissection and study. After examination in glycerin, they were transferred to fresh glycerin and stored in a microvial pinned below the specimen. Specimens examined were deposited in the Henan University of Science and Technology, Luoyang, Henan, China (HAUST).

Taxonomy

Key to species of *Homoneura (Homoneura) henanensis* group in China

(modified from Gao & Shi, 2019; Chen & Li, 2022)

1. Wing with brown spot at tip of Sc and R_1 elongating along costal margin 2
- Wing without brown spot at tip of Sc and R_1 3
2. Basal edge of brown apical spot on R_{2+3} behind vertical level of crossvein dm-cu; wing with brown spot at tip of Sc and R_1 slightly elongating along costal margin; surstylus claviform with three long setulae, postgonite long coniform with five short setulae. *H. (H.) hirayamae* (Matsumura, 1916)
- Basal edge of brown apical spot on R_{2+3} at same vertical level of crossvein dm-cu; wing with brown spot at tip of Sc and R_1 , extending closely to brown apical spot on R_{2+3} along costal margin; surstylus without long setula, short claviform with a subapical concavity in posterior view; postgonite hook-like and sharp at apex *H. (H.) similicurvata* Gao & Shi, 2019
3. Basal edge of brown apical spot on R_{2+3} at same vertical level of crossvein dm-cu 4
- Basal edge of brown apical spot on R_{2+3} behind vertical level of crossvein dm-cu 11
4. Palpus yellow except for black at tip; surstylus broad, sheet-like with short apical setulae in lateral view and curved apically in posterior view. *H. (H.) dadongshanica* Shi & Yang, 2014
- Palpus entirely yellow; surstylus not as above. 5
5. Subcostal cell not as following. 6
- Subcostal cell brown apically 8
6. Male tergites 3–5 each without brown posterior margin; ctenidium with 14 short setae on ventral margin of fore femur; surstylus with a small acute teeth-like process in lateral view. *H. (H.) brevis* Gao & Yang, 2004
- Male tergites 3–5 each with brown posterior margin; ctenidium with 17–19 short setae on ventral margin of fore femur; surstylus not as above 7
7. Body length 8.5–9.0 mm; frons with one wide brown stripe; ctenidium with 18–19 short setae on ventral margin of fore femur; mid femur with 6–7 anterior setae; wing with brown apical spots on R_{2+3} , R_{4+5} and M_1 confluent; brown oval median spot on R_{2+3} larger. *H. (H.) shunhuangshana* Chen & Li, 2022
- Body length 6.9–7.5 mm; frons with a pair of brown stripes; ctenidium with 17 short setae on ventral margin of fore femur; mid femur with 4 anterior setae; wing with brown apical spots on R_{4+5} and M_1 confluent, separated from apical spot on R_{2+3} ; brown oval median spot on R_{2+3} smaller *H. (H.) anadaequata* Gao & Shi, 2019
8. Mesonotum with acrostichal setulae in irregular 6 rows. 9
- Mesonotum with acrostichal setulae in irregular 10 rows 10
9. Arista with longest ray slightly shorter than 1/2 height of first flagellomere; surstylus with a small triangular process with several setulae in lateral view. *H. (H.) dagupingensis* Gao & Shi, 2019
- Arista with longest ray as long as height of first flagellomere; surstylus (Fig.26) with a long digitiform process in lateral view and without subapical concavity. *H. (H.) wuxica* sp. nov.
10. Arista with longest ray shorter than height of first flagellomere; ctenidium with 19 short setae on fore femur.
- *H. (H.) stepheni* Shi, Gao & Shen, 2017
- Arista with longest ray as long as height of first flagellomere; ctenidium with 13–16 short setae on ventral margin of fore femur. *H. (H.) yaromi* Yang, Hu & Zhu, 2001
11. Basal edge of brown apical spot on R_{2+3} at same vertical level of apical spot on R_{4+5} ; apical spot on R_{4+5} close to brown spot on crossvein dm-cu or at least 2/3 length of ultimate section of M_1 12
- Basal edge of brown apical spot on R_{4+5} behind vertical level of apical spot on R_{2+3} ; apical spot on R_{4+5} far from brown spot on crossvein dm-cu and shorter than 2/3 length of ultimate section of M_1 15
12. Apical spot on R_{4+5} close to brown spot on crossvein dm-cu; ctenidium with 16 short setae on ventral margin of fore femur; surstylus acute apically in lateral view; pregonite absent; postgonite consisting of a furcated process and a subuliform process in ventral view *H. (H.) denticulata* Shi & Yang, 2014
- Apical spot on R_{4+5} about 2/3 length of ultimate section of M_1 , not close to brown spot on crossvein dm-cu; ctenidium with 12–14 short setae on ventral margin of fore femur; surstylus blunt apically in lateral view, pregonite with a reverse U-shaped process and postgonite consisting a pair of subuliform processes in ventral view. 13
13. Hypandrium with a short ventral process; pregonite with a pair of reverse U-shaped processes in ventral view; postgonite short subuliform, but pregonite longer than postgonite in ventral view. 14

- Hypandrium with a long ventral process; shape of pregonite and postgonite not as above, but pregonite shorter than postgonite in ventral view *H. (H.) pseudograndis* Papp & Gaimari, 2013
14. Phallus with a pair of lateral teeth subapically in ventral view; two arms of reverse U-shaped pregonite asymmetrical distinctly. *H. (H.) simigrandis* Shi & Yang, 2014
- Phallus without a pair of lateral teeth subapically in ventral view; two arms of reverse U-shaped pregonite almost symmetrical in length *H. (H.) grandis* (Kertész, 1915)
15. Wing with brown string-like spot on R_{2+3} and apical spots on R_{4+5} and M_1 ; epandrium slender and surstylus acute apically with a long seta in lateral view *H. (H.) curvispina* Gao & Yang, 2003
- Wing with round, elliptical or quadrate spot on R_{2+3} , R_{4+5} and M_1 , not as above; epandrium and surstylus not as above. 16
16. Wing with brown apical spots on R_{2+3} , R_{4+5} and M_1 entirely confluent, or slightly confluent and forming pale brown connecting area between apical spots on R_{2+3} , R_{4+5} and M_1 17
- Wing with brown apical spots on R_{4+5} and M_1 confluent, separated from apical spot on R_{2+3} , or apical spots on R_{2+3} , R_{4+5} and M_1 entirely separated 21
17. Brown medial spot on R_{4+5} separated from brown cloud on crossvein dm-cu 18
- Brown medial spot on R_{4+5} confluent with brown cloud on crossvein dm-cu 19
18. Fore femur with 8 posterodorsal setae and 3 posteroventral setae; abdominal tergites 2–5 without blackish brown posterior margin; syntergosternite without broad membranous ventral process and with 2–3 long hairs around spiracle; surstylus without apical concavity; phallus not curved, with a pair of triangular subapical processes in lateral view *H. (H.) martini* Shi, Gao & Shen, 2017
- Fore femur with 10 posterodorsal setae and 4–5 posteroventral setae; abdominal tergites 2–5 with blackish brown posterior margin (Fig.5); syntergosternite (Fig.8) with broad membranous ventral process and without long hair around spiracle; surstylus (Figs.6-7) with apical concavity; phallus (Fig.10) curved, without subapical processes in lateral view. *H. (H.) apiconcava* **sp. nov.**
19. Fore femur with 4 posteroventral setae; syntergosternite circular 20
- Fore femur with 6 posteroventral setae; syntergosternite semicircular *H. (H.) yangi* Gao & Yang, 2005
20. Abdominal tergites 2–5 without blackish brown posterior margin; surstylus indistinct, blunt apically; hypandrium Y-shaped; phallus without triangular median process in ventral view *H. (H.) guizhouensis* Gao & Yang, 2002
- Abdominal tergites 2–5 with blackish brown posterior margin (Fig.35); surstylus (Fig.36) distinctly digitiform in lateral view; hypandrium (Fig.39) H-shaped; phallus (Fig.39) with a pair of triangular median process in ventral view. *H. (H.) yintiaolingica* **sp. nov.**
21. Wing with brown apical spot on R_{4+5} and M_1 slightly confluent and forming pale brown connecting area between two apical spots; apical spot on R_{2+3} distinctly separated from apical spot on R_{4+5} 22
- Wing with brown apical spots on R_{2+3} , R_{4+5} and M_1 entirely separated 35
22. Mesonotum with acrostichal setulae in 10 rows. 23
- Mesonotum with acrostichal setulae in 6–8 rows. 26
23. Subcostal cell hyaline. 24
- Subcostal cell pale brown or brown apically 25
24. Surstylus bulged claviform, with long setulae in lateral view; abdominal tergites 2–5 with pale brown posterior margin; arista with longest ray as long as height of first flagellomere; ctenidium with 16–17 short setae on ventral margin of fore femur; hypandrium Y-shaped. *H. (H.) bispinalis* Yang, Hu & Zhu, 2001
- Surstylus T-shaped and rounded apically in lateral view; abdominal tergites 2–5 without pale brown posterior margin; arista with longest ray shorter than height of first flagellomere; ctenidium with ten short setae on ventral margin of fore femur; hypandrium H-shaped *H. (H.) fujianensis* Yang, Zhu & Hu, 2003
25. Mesoscutum with one square or oval brown spot before scutoscutellar suture, scutellum with one square brown spot at middle; fore femur with seven to eight posterior dorsal setae, ctenidium with 22 short setae; surstylus long spine-like in lateral view, without inner process *H. (H.) maculiscutellata* Chen & Li, 2022
- Mesoscutum without spot before scutoscutellar suture, scutellum without brown spot; fore femur with five posterior dorsal setae, ctenidium with 12 short setae; surstylus with one short claviform inner process in lateral view *H. (H.) tianeensis* Gao & Yang, 2004
26. Abdomen yellow or pale brown, at least tergites 2–5 with black or brown posterior margin 27
- Abdomen yellow, tergites 1–6 without brown posterior margin 28
27. Arista with longest ray as long as height of first flagellomere; abdomen pale brown; surstylus straight claviform in lateral view. *H. (H.) serrata* Gao & Yang, 2002
- Arista with longest ray as long as 1/2 height of first flagellomere; abdomen yellow; surstylus long subuliform in lateral view *H. (H.) longiacutata* Gao & Shi, 2019
28. Mid femur with 5–6 anterior setae 29
- Mid femur with 4 anterior setae 32
29. Mesonotum with acrostichal setulae in 6 rows. 30
- Mesonotum with acrostichal setulae in 8 rows. 31
30. Arista with longest ray as long as 4/5 height of first flagellomere; surstylus long and curved at apex in lateral view *H. (H.) longicurva* Gao & Shi, 2019
- Arista with longest ray slightly shorter than height of first flagellomere; surstylus (Fig.16) short and narrow in lateral view. *H. (H.) chongqingensis* **sp. nov.**
31. Fore femur with 6 posterior dorsal setae, two posterior ventral setae and ctenidium with 12 short setae; surstylus consisting of

- a small acute apical process, directed downward and a slender knife-like process with dense setulae on dorsal margin in lateral view. *H. (H.) henanensis* Yang, Zhu & Hu, 1999
- Fore femur with 8 posterior dorsal setae, four posterior ventral setae and ctenidium with 15–17 short setae; surstylus claviform in lateral view. *H. (H.) pangae* Shi, Gao & Shen, 2017
32. Wing with a brown spot between r-m and apical spot on R_{4+5} distinctly or slightly confluent with brown spot on crossvein dm-cu; surstylus claviform or digitiform. 33
- Wing with a brown quadrate spot between r-m and apical spot on R_{4+5} separated from brown spot on crossvein dm-cu; surstylus not as above. 34
33. Ctenidium with 15 short setae on ventral margin of fore femur; surstylus absent; pregonite short, broad and acute apically in ventral view; postgonite consisting of a furcated process and a slender subuliform process in ventral view.
- *H. (H.) curvispinosa* Yang, Hu & Zhu, 2001
- Ctenidium with 13 short setae on ventral margin of fore femur; surstylus digitiform with long setulae in lateral view; pregonite and postgonite furcated apically, pregonite shorter than postgonite in ventral view. *H. (H.) zonalis* Yang, Zhu & Hu, 1999
34. Fore femur with 3 posteroventral setae; epandrium blunt triangular apically; surstylus separated from epandrium and originated from anterior ventral corner of epandrium, with dense tiny setulae on apical 2/3. *H. (H.) tianjingshanica* Shi & Yang, 2014
- Fore femur with 4 posteroventral setae; epandrium and surstylus fused, blunt round apically.
- *H. (H.) tianmushana* Yang, Hu & Zhu, 2001
35. Ctenidium with 17–19 short setae on ventral margin of fore femur. 36
- Ctenidium with 10–16 short setae on ventral margin of fore femur 37
36. The first flagellomere about 1.8 times longer than high; surstylus narrow columnar in lateral view and broad with tiny setulae in posterior view; postgonites triangular with sharp apex in lateral view. *H. (H.) zhangjiagensis* Shi & Yang, 2014
- The first flagellomere about 2.3 times longer than high; surstylus light colour and narrow at base while dark yellow and broad at apex, nearly trapeziform with two long setulae in lateral view; postgonite hook-like in lateral view.
- *H. (H.) bicolorata* Gao & Shi, 2019
37. Pregonite and postgonite long subuliform in ventral view or short triangular in lateral view. 38
- Pregonite and postgonite not as above. 40
38. Surstylus without acute or triangular process, blunt round apically and slightly rolled up with several setulae in lateral view.
- *H. (H.) miaoae* Gao & Shi, 2019
- Surstylus with acute or triangular process, not as above in lateral view 39
39. Surstylus very broad ball-like with a triangular process apically in lateral view; hypandrium H-shaped; phallus acute subapically in lateral view. *H. (H.) kuankuoshuiensis* Wang & Yang, 2012
- Surstylus narrow, acute apically in lateral view; hypandrium Y-shaped; phallus blunt round subapically in lateral view
- *H. (H.) chinensis* Malloch, 1926
40. Subcostal cell hyaline or pale yellow apically. 42
- Subcostal cell dark apically 43
41. Mesonotum with acrostichal setulae in regular six rows; surstylus curved knife-like in lateral view; postgonite absent.
- *H. (H.) spectabilis* Gao & Shi, 2019
- Mesonotum with acrostichal setulae in irregular ten rows; surstylus not as above. 42
42. Basal edge of brown apical spot on R_{4+5} at same vertical level of apical spot on M_1 ; surstylus consisting of a slender knife-shaped process and a furcated process with several setulae on subapical and apical margin and a small tooth on lateral margin in lateral view. *H. (H.) caoi* Wang & Yang, 2012
- Basal edge of brown apical spot on R_{4+5} behind vertical level of apical spot on M_1 ; surstylus short and broad, with a row of long apical setulae *H. (H.) jiangxiensis* Shi, Gao & Shen, 2017
43. Syntergosternite elliptic without sternal part flat; surstylus broad and slightly curved apically in lateral view
- *H. (H.) platimarginata* Gao & Shi, 2019
- Syntergosternite circular, but with sternal part flat; surstylus not as above. 44
44. Mesonotum with acrostichal setulae in 8 rows. *H. (H.) curvata* Yang, Zhu & Hu, 1999
- Mesonotum with acrostichal setulae in irregular 10 rows 45
45. A brown elliptical spot present between r-m and apical spot on R_{4+5} ; mid femur with 6–8 anterior setae; surstylus curved knife-like, acute apically in lateral view; postgonite longer than phallus, long subuliform, curved forward apically in lateral view
- *H. (H.) longispina* Gao & Yang, 2004
- A brown square spot present between r-m and apical spot on R_{4+5} ; mid femur with 4 anterior setae; surstylus short, triangular and acutate apically, with several long setae on dorsal margin and a row of short setulae on ventral margin in lateral view; both pregonite and postgonite short subuliform, about half length of phallus in ventral view
- *H. (H.) acutata* Yang, Zhu & Hu, 1999

Homoneura (Homoneura) apiconcava sp. nov. (Figs 1–10)

Diagnosis. Mesonotum with acrostichal setulae in irregular eight rows. Wing with brown apical spots on R_{2+3} , R_{4+5} and M_1 slightly confluent and forming pale brown connecting area between apical spots. Surstylus with concavity apically in lateral view. Pregonite rounded apically, postgonite furcated. Phallus curved backward and hook-like apically in lateral view.

Description. MALE. Body length 9.5–10.0mm, wing length 9.5–9.8mm. FEMALE. Body length 9.6–10.1mm, wing length 9.5–9.9mm.

Head (Fig. 1) yellow. Frons as long as wide and parallel-sided, with a pair of pale brown stripes extending to sides of ocellar triangle; ocellar triangle yellow, ocellar seta developed. Gena about 1/7 height of eye. Antenna yellow, first flagellomere about 2.0 times longer than high; arista black except yellow at base, long plumose, with longest ray as long as height of first flagellomere. Proboscis yellow, with pale yellow and black setulae; palpus yellow, with black setulae.

Thorax (Fig. 4) yellow, with gray pruinosity. 0+3 dorsocentral setae, anteriormost postsutural dorsocentral seta far from scutal suture, acrostichal setulae in irregular eight rows. Legs pale yellow. Fore femur with ten posterior dorsal setae, four to five posterior ventral setae and ctenidium with 12 short setae; fore tibia with one dorsal preapical seta and one apical ventral seta. Mid femur with six to seven anterior setae and one apical posterior seta; mid tibia with one strong dorsal preapical seta and four strong apical ventral setae. Hind femur with one preapical anterior dorsal seta; hind tibia with one dorsal preapical seta and one short apical ventral seta. Wing (Fig. 2) slightly yellow, basal margin of brown apical spot on R_{2+3} distinctly behind vertical level of crossvein dm-cu; brown apical spots on R_{2+3} , R_{4+5} and M_1 slightly confluent and forming pale brown connecting area between apical spots on R_{2+3} , R_{4+5} and M_1 ; brown median spot on R_{4+5} separated from brown cloud-like spot on crossvein dm-cu; subcostal cell pale brown apically; costa with 2nd (between R_1 and R_{2+3}), 3rd (between R_{2+3} and R_{4+5}), and 4th (between R_{4+5} and M_1) sections in proportion of 4.7mm: 1.2mm: 1.1mm; r-m distinctly before middle of discal cell; ultimate and penultimate sections of M_1 in proportion of 2.6mm: 2.4mm; ultimate section of CuA_1 about 1/7 of penultimate. Haltere yellow.

Abdomen (Fig. 5) yellow, tergites 2–5 with blackish brown posterior margin. Male genitalia (Fig. 6–10): syntergosternite circular. Epandrium broad in lateral view; surstylus with concavity apically in lateral view. Hypandrium H-shaped. Pregonite rounded apically, postgonite furcated. Phallus curved backward and hook-like apically in lateral view. Phallopodeme shorter than phallus.

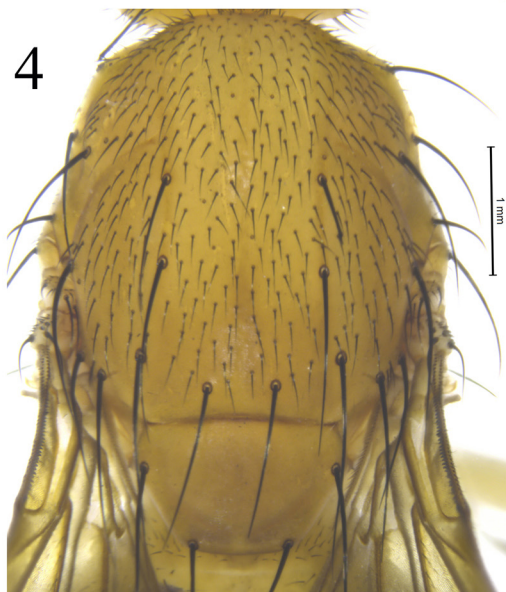
Type material. Holotype male, China, **Chongqing**: Wuxi County, Yintiaoling Nature Reserve, Linkouzi Management and Protection Station to Guimenguan, 31°28'36"N, 109°53'19"E, elev. 1349 m, 2022. VIII. 11, leg. Xulong Chen. **Paratypes**: 3 males and 9 females, same data as holotype; 1 male and 6 females, Yintiaoling, Ganheba, 31°31'25"N, 109°49'32"E, elev. 1258m, 2022. VI. 25, leg. Xulong Chen; 1 male and 1 female, Yintiaoling, Zhuaping, 31°28'30"N, 109°52'41"E, elev. 1456m, 2022. VI. 28, leg. Xulong Chen; 1 male, Yintiaoling, Linkouzi, 31°28'27"N, 109°52'55"E, elev. 1294m, 2022. VI. 29, leg. Xulong Chen; 1 female, Yintiaoling, Lanying Town, Huangcaoping, 31°24'59"N, 109°55'25"E, elev. 2039m, 2022. VIII. 14, leg. Xulong Chen; 1 female, Yintiaoling, Guanshan, Maizitang, 31°32'15"N, 109°42'19"E, elev. 2168m, 2022. VIII. 17, leg. Xulong Chen; 1 male, Yintiaoling, Hongqi Management and Protection Station, 31°30'32"N, 109°49'11"E, elev. 1117m, 2022. IX. 22, leg. Xulong Chen; 2 females, Yintiaoling, Hongqi Management and Protection Station, Ganheba, 31°31'25"N, 109°49'32"E, elev. 1258m, 2022. IX. 23, leg. Xulong Chen; 5 males and 5 females, Yintiaoling, Lanying Town, Xi'an Village, 31°24'1"N, 109°51'52"E, elev. 1637m, 2022. IX. 24, leg. Xulong Chen.

Etymology. The specific name comes from the combination of the prefix 'api-' (meaning apical) and the Latin word, 'concava' (meaning concave), referring to the surstylus with concavity apically in lateral view.

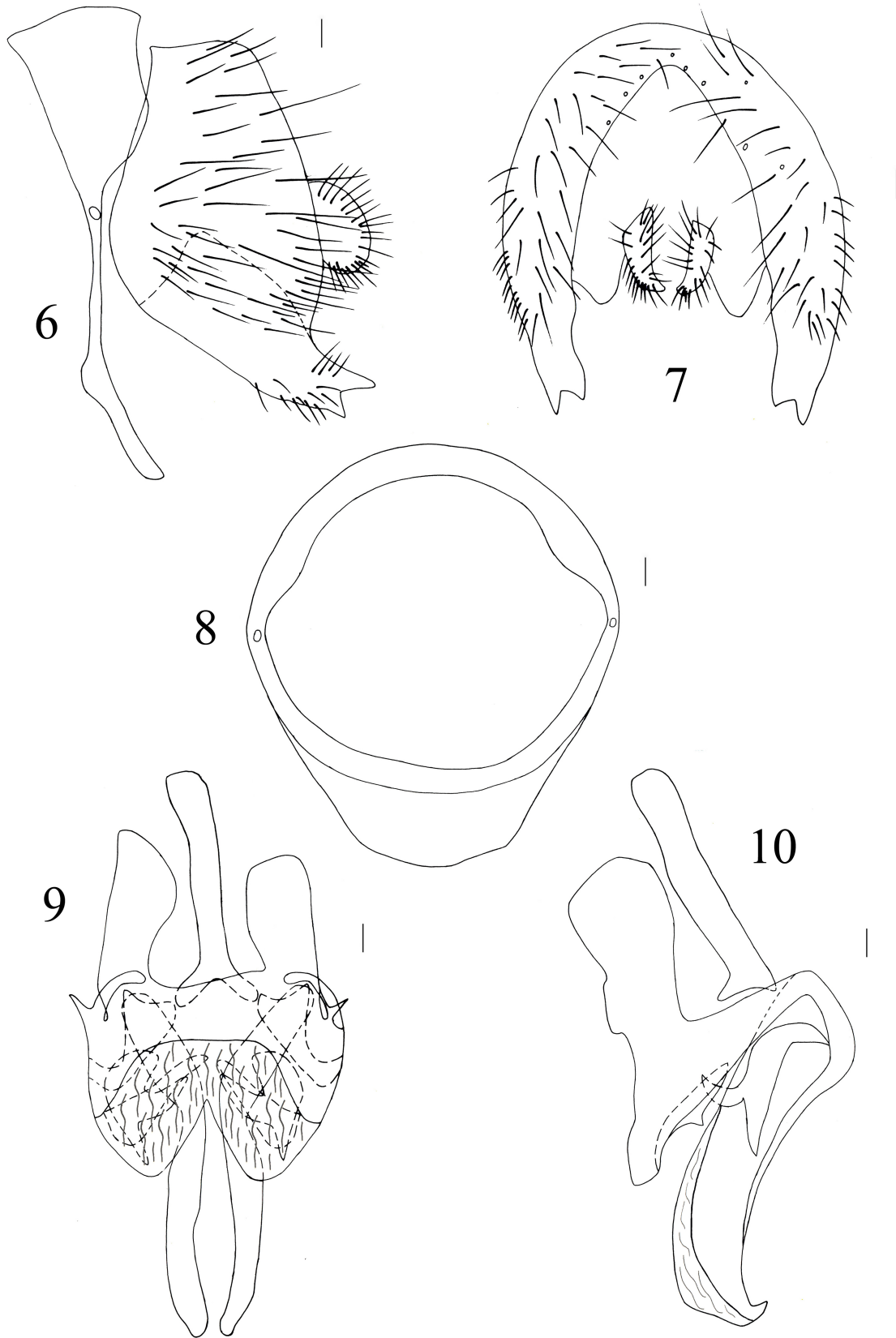
Distribution. China (Chongqing)

Remarks. The new species is very similar to *H. (H.) shunhuangshana* Chen & Li, 2022 from Hunan of China, but it can be separated from the latter by the mesonotum with acrostichal setulae in irregular eight rows; fore femur with ten posterior dorsal setae and ctenidium with 12 short setae; basal margin of brown apical spot on R_{2+3} distinctly behind vertical level of crossvein dm-cu; surstylus with concavity apically in lateral view. In *H. (H.) shunhuangshana*, mesonotum with acrostichal setulae in irregular ten rows; fore femur with eight posterior dorsal setae and ctenidium with 18–19 short setae; basal margin of brown apical spot on R_{2+3} at same vertical level of crossvein dm-cu; surstylus without concavity apically in lateral view.

The new species is also somewhat similar to *H. (H.) martini* Shi, Gao & Shen, 2017 from Henan and Jiangxi of China, but it can be separated from the latter by the fore femur with ten posterodorsal setae and four to five posteroventral setae; abdominal tergites 2–5 with blackish brown posterior margin; syntergosternite with broad membranous ventral process and without long hair around spiracle; surstylus with apical concavity; phallus curved, without subapical processes in lateral view. In *H. (H.) martini*, fore femur with eight posterodorsal setae and three posteroventral setae; abdominal tergites 2–5 without blackish brown posterior margin; syntergosternite without broad membranous ventral process and with 2–3 long hairs around spiracle; surstylus without apical concavity; phallus not curved, with a pair of triangular subapical processes in lateral view.



FIGURES 1–5. *Homoneura (Homoneura) apiconcava* **sp. nov.** Male. 1. head, anterior view; 2. wing; 3. habitus, lateral view; 4. thorax, dorsal view; 5. abdomen, dorsal view.



FIGURES 6–10. *Homoneura (Homoneura) apiconcava* **sp. nov.** Male. 6. sytergosternite and epandrium, lateral view; 7. epandrial complex, posterior view; 8. sytergosternite, anterior view; 9. aedeagal complex, ventral view; 10. aedeagal complex, lateral view. Scale 0.5 mm.

Homoneura (Homoneura) chongqingensis sp. nov. (Figs 11–20)

Diagnosis. Mesonotum with acrostichal setulae in six rows. Wing with brown apical spot on R_{4+5} and M_1 slightly confluent and forming pale brown connecting area between two apical spots; apical spot on R_{2+3} separated from apical spot on R_{4+5} . Surstylus short and narrow, situated at subapical of epandrium in lateral view. Pregonite furcated apically in ventral view, postgonite curved apically. Phallus broad in lateral view, and with a triangular process subapically.

Description. MALE. Body length 5.7–6.0mm, wing length 6.4–6.6mm. FEMALE. Body length 6.3–6.5mm, wing length 6.3–6.5mm.

Head (Fig. 11) yellow. Frons as long as wide and parallel-sided, with a pair of pale brown stripes extending to sides of ocellar triangle; ocellar triangle yellow, ocellar seta developed, longer than anterior fronto-orbital seta, anterior fronto-orbital seta slightly shorter than posterior fronto-orbital seta. Gena about 1/7 height of eye. Antenna yellow, first flagellomere about 1.9 times longer than high, pale yellow; arista brown except yellow at base, plumose, with longest ray slightly shorter than height of first flagellomere. Proboscis yellow, with pale yellow and black setulae; palpus yellow, with black setulae.

Thorax (Fig. 14) yellow, with gray pruinosity. 0+3 dorsocentral setae, anteriormost postsutural dorsocentral seta far from scutal suture, acrostichal setulae in six rows. Legs pale yellow. Fore femur with five posterior dorsal setae, four posterior ventral setae and ctenidium with ten short setae; fore tibia with one dorsal preapical seta and one apical ventral seta. Mid femur with five anterior setae and one apical posterior seta; mid tibia with one strong dorsal preapical seta and one strong apical ventral seta. Hind femur with one preapical anterior dorsal seta; hind tibia with one weak dorsal preapical seta and one short apical ventral seta. Wing (Fig. 12) slightly yellow, basal margin of brown apical spot on R_{2+3} distinctly behind vertical level of crossvein dm-cu; brown apical spot on R_{4+5} and M_1 slightly confluent and forming pale brown connecting area between two apical spots; apical spot on R_{2+3} separated from apical spot on R_{4+5} ; brown median spot on R_{4+5} slightly fused with brown cloud-like spot on crossvein dm-cu; subcostal cell brown apically; costa with 2nd (between R_1 and R_{2+3}), 3rd (between R_{2+3} and R_{4+5}), and 4th (between R_{4+5} and M_1) sections in proportion of 3.2mm: 0.9mm: 0.7mm; r-m distinctly before middle of discal cell; ultimate and penultimate sections of M_1 in proportion of 2.0mm: 1.4mm; ultimate section of CuA_1 about 1/7 of penultimate. Haltere pale yellow.

Abdomen (Fig. 15) yellow, tergites 1–2 pale yellow. Male genitalia (Figs. 16–20): syntergosternite circular. Epandrium broad in lateral view; surstylus short and narrow, situated at subapical of epandrium in lateral view. Pregonite furcated apically in ventral view, postgonite curved apically. Phallus broad in lateral view, and with a triangular process subapically. Phallapodeme longer than phallus.

Type material. **Holotype male**, China, **Chongqing**: Wuxi County, Yintiaoling Nature Reserve, Lanying Town, Huangcaoping, 31°24'58"N, 109°55'25"E, elev. 2039 m, 2022. VIII. 14, leg. Xulong Chen. **Paratypes**: 3 males and 4 females, same data as holotype.

Etymology. The specific epithet is named for the Chongqing Municipality.

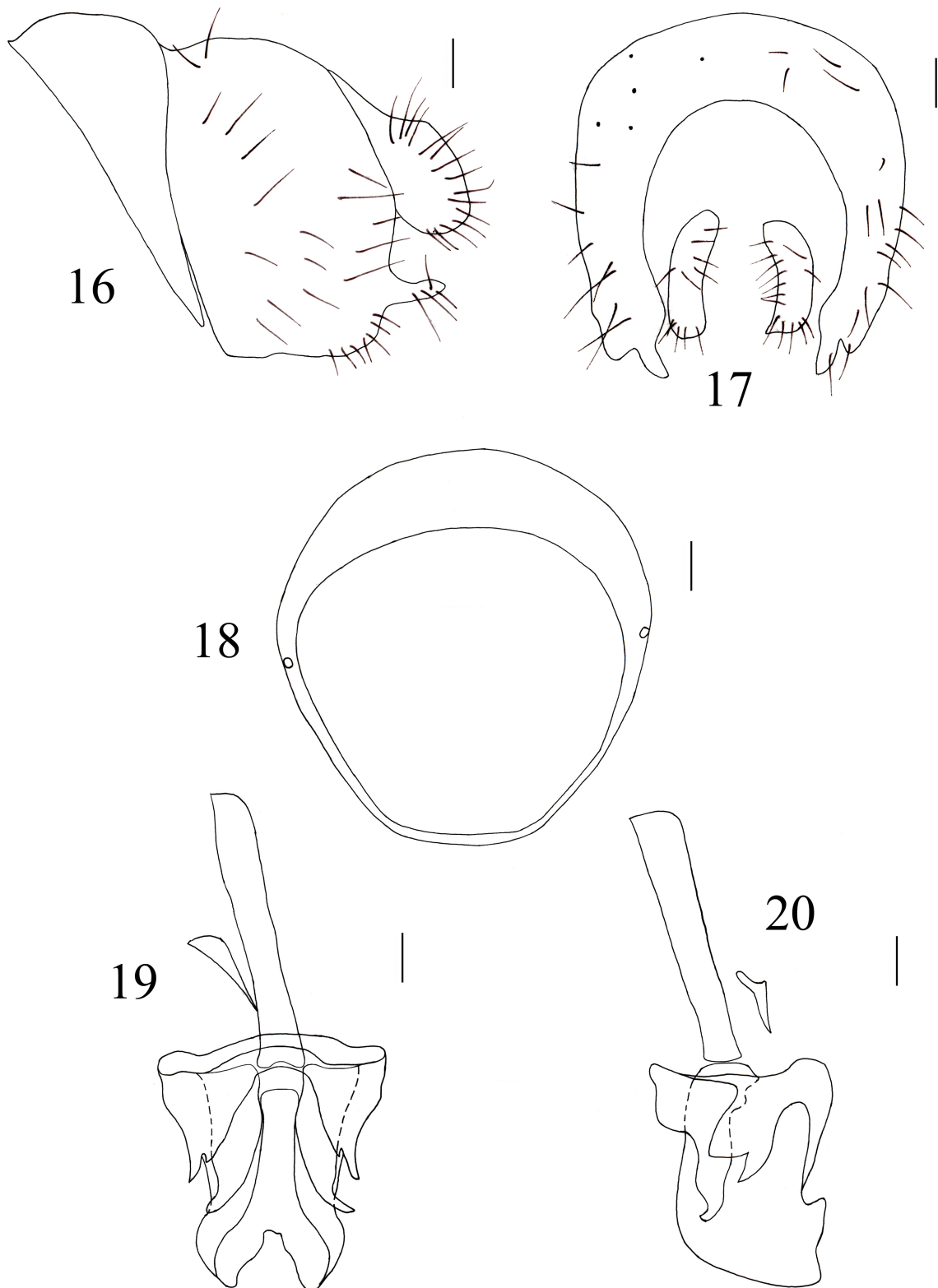
Distribution. China (Chongqing).

Remarks. The new species is somewhat similar to *H. (H.) longicurva* Gao & Shi, 2019 from Shaanxi and Hubei of China, but it can be separated from the latter by the arista with longest ray slightly shorter than height of first flagellomere; surstylus short and narrow in lateral view. In *H. (H.) longicurva*, the arista with longest ray as long as 4/5 height of first flagellomere; surstylus long and curved at apex in lateral view.

The new species is somewhat similar to *H. (H.) henanensis* Yang, Zhu & Hu, 1999 from Beijing, Hebei, Henan and Shaanxi of China, but it can be separated from the latter by the mesonotum with acrostichal setulae in six rows; ctenidium with ten short setae on fore femur; brown median spot on R_{4+5} slightly fused with brown cloud-like spot on crossvein dm-cu; surstylus short and narrow in lateral view. In *H. (H.) henanensis*, the mesonotum with acrostichal setulae in eight rows; ctenidium with 12 short setae on fore femur; brown medial spot on R_{4+5} separated from brown cloud on crossvein dm-cu; surstylus consisting of a small acute apical process and a slender knife-like process in lateral view.



FIGURES 11–15. *Homoneura (Homoneura) chongqingensis* sp. nov. Male. 11. head, anterior view; 12. wing; 13. habitus, lateral view; 14. thorax, dorsal view; 15. abdomen, dorsal view.



FIGURES 16–20. *Homoneura (Homoneura) chongqingensis* sp. nov. Male. 16. sytergosternite and epandrium, lateral view; 17. epandrial complex, posterior view; 18. sytergosternite, anterior view; 19. aedeagal complex, ventral view; 20. aedeagal complex, lateral view. Scale 0.5 mm.

Homoneura (Homoneura) wuxica sp. nov. (Figs 21–30)

Diagnosis. Basal margin of brown apical spot on R_{2+3} at same vertical level of crossvein dm-cu. Surstylus hairy and extended from interior of epandrium, finger-like in lateral view. Hypandrium Y-shaped. Pregonite short, postgonite coniform. Phallus narrow in ventral view, with a tiny submedial teeth-like process in lateral view.

Description. MALE. Body length 7.4–7.7mm, wing length 7.3–7.6mm. FEMALE. Body length 7.4–7.8mm, wing length 7.2–7.6mm.

Head (Fig. 21) yellow. Frons as long as wide and parallel-sided, with a pair of pale brown stripes extending to sides of ocellar triangle; ocellar triangle brown, ocellar seta developed. Gena about 1/9 height of eye. Antenna yellow, first flagellomere about 1.9 times longer than high; arista black except yellow at base, long plumose, with longest ray as long as height of first flagellomere. Proboscis yellow, with pale yellow and black setulae; palpus yellow, with black setulae.

Thorax (Fig. 24) yellow, with gray pruinosity. 0+3 dorsocentral setae, anteriormost postsutural dorsocentral seta far from scutal suture, acrostichal setulae in irregular six rows. Legs pale yellow. Fore femur with seven posterior dorsal setae, five posterior ventral setae and ctenidium with 16 short setae; fore tibia with one dorsal preapical seta and one apical ventral seta. Mid femur with six anterior setae and one apical posterior seta; mid tibia with one strong dorsal preapical seta and three strong apical ventral setae. Hind femur with one preapical anterior dorsal seta; hind tibia with one dorsal preapical seta and one short apical ventral seta. Wing (Fig. 22) slightly yellow, basal margin of brown apical spot on R_{2+3} at same vertical level of crossvein dm-cu; brown apical spots on R_{2+3} , R_{4+5} and M_1 slightly confluent and forming pale brown connecting area between apical spots on R_{2+3} , R_{4+5} and M_1 ; brown median spot on R_{4+5} separated from brown cloud-like spot on crossvein dm-cu; subcostal cell brown apically; costa with 2nd (between R_1 and R_{2+3}), 3rd (between R_{2+3} and R_{4+5}), and 4th (between R_{4+5} and M_1) sections in proportion of 3.7mm: 1.1mm: 0.9mm; r-m before middle of discal cell; ultimate and penultimate sections of M_1 in proportion of 2.2mm: 2.0mm; ultimate section of CuA_1 about 1/7 of penultimate. Haltere yellow.

Abdomen (Fig. 25) brown. Male genitalia (Figs. 26–30): syntergosternite circular. Epandrium broad in lateral view; surstylus hairy and extended from interior of epandrium, finger-like in lateral view. Hypandrium H-shaped. Pregonite short, postgonite coniform. Phallus narrow in ventral view, with a tiny submedial teeth-like process in lateral view. Phallapodeme longer than phallus.

Type material. Holotype male, China, **Chongqing**: Wuxi County, Yintiaoling Nature Reserve, Linkouzi Management and Protection Station to Guimenguan, 31°28'36"N, 109°53'19"E, elev. 1349 m, 2022. VIII. 11, leg. Xulong Chen. **Paratypes**: 56 males and 1 female, same data as holotype; 10 males and 11 females, Yintiaoling, Zhuanning, 31°28'30"N, 109°52'41"E, elev. 1456m, 2022. VI. 28, leg. Xulong Chen; 10 males, Yintiaoling, Linkouzi Management and Protection Station, 31°28'27"N, 109°52'55"E, elev. 1294 m, 2022. VI. 29, leg. Xulong Chen.

Etymology. The specific epithet is named for the type locality, Wuxi County.

Distribution. China (Chongqing)

Remarks. The new species is very similar to *H. (H.) dagupingensis* Gao & Shi, 2019 from Shaanxi of China, but it can be separated from the latter by the arista with longest ray as long as height of first flagellomere; ctenidium with 16 short setae on fore femur; surstylus with a long digitiform process in lateral view and without subapical concavity. In *H. (H.) dagupingensis*, the arista with longest ray slightly shorter than 1/2 height of first flagellomere; ctenidium with 12 short setae on fore femur; surstylus with a small triangular process with several setulae in lateral view.

The new species is somewhat similar to *H. (H.) yintiaolingica* sp. nov. described below, but it can be separated by the fore femur with seven posterior dorsal setae; mid femur with six anterior setae; brown median spot on R_{4+5} separated from brown cloud-like spot on crossvein dm-cu. In *H. (H.) yintiaolingica*, the fore femur with five posterior dorsal setae; mid femur with four anterior setae; brown median spot on R_{4+5} slightly fused with brown cloud-like spot on crossvein dm-cu.



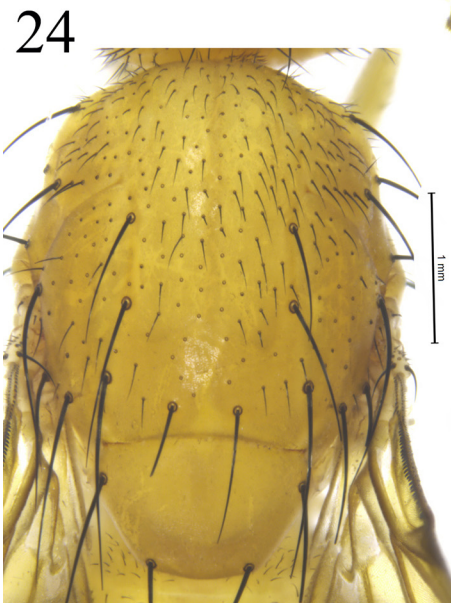
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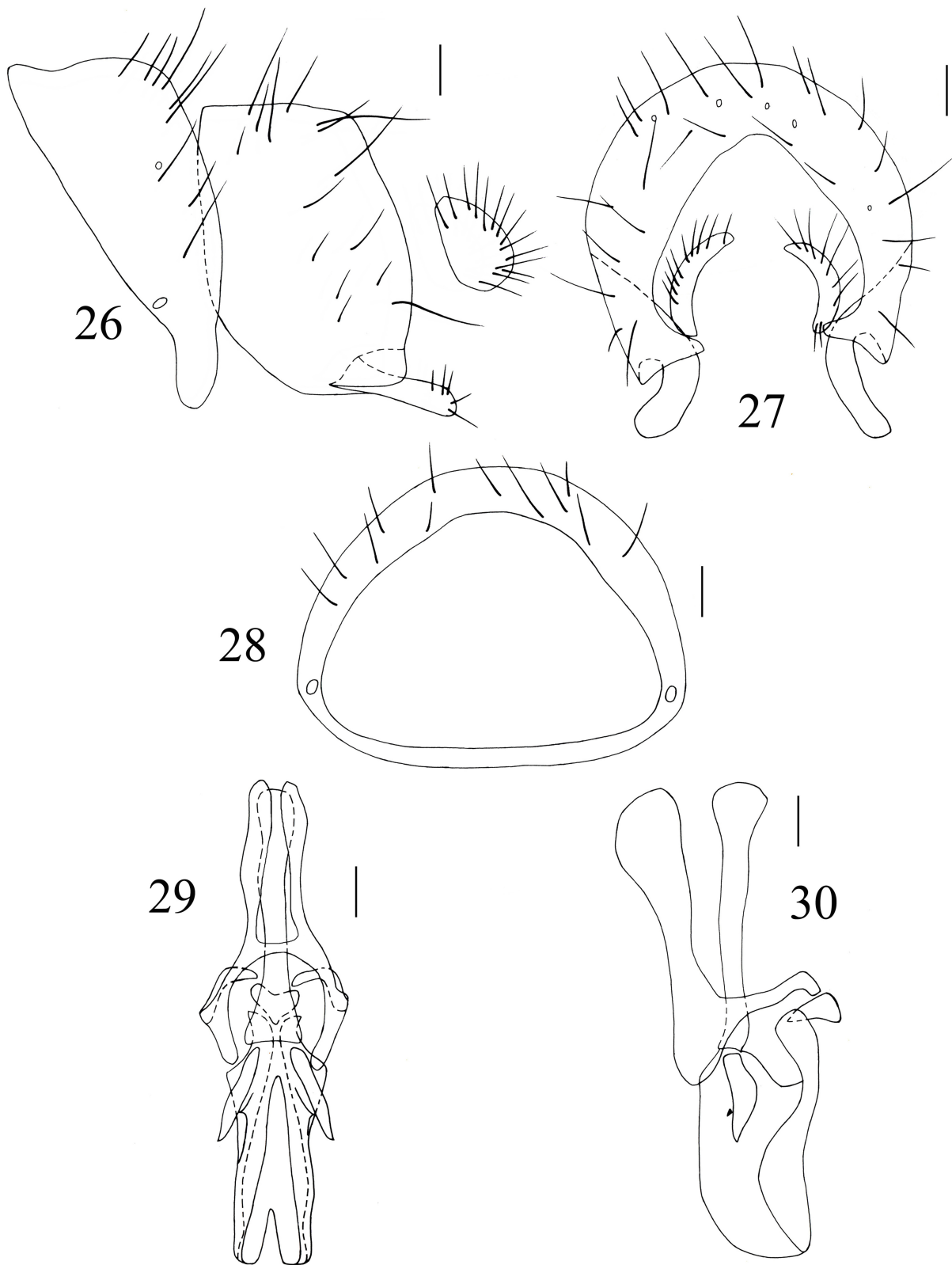


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FIGURES 21–25. *Homoneura (Homoneura) wuxica* sp. nov. Male. 21. head, anterior view; 22. wing; 23. habitus, lateral view; 24. thorax, dorsal view; 25. abdomen, dorsal view.



FIGURES 26–30. *Homoneura (Homoneura) wuxica* **sp. nov.** Male. 26. sytergosternite and epandrium, lateral view; 27. epandrial complex, posterior view; 28. sytergosternite, anterior view; 29. aedeagal complex, ventral view; 30. aedeagal complex, lateral view. Scale 0.5 mm.

Homoneura (Homoneura) yintiaolingica sp. nov. (Figs 31–40)

Diagnosis. Mesonotum with acrostichal setulae in irregular six rows. Wing with brown median spot on R_{4+5} slightly fused with brown cloud-like spot on crossvein dm-cu. Surstylus hairy and finger-like in lateral view, blunt apically in posterior view. Pregonite coniform, postgonite furcated into two coniform processes in lateral view. Phallus curved backward and acute apically in lateral view, with a pair of triangular submedial processes in ventral view.

Description. MALE. Body length 6.0–6.3mm, wing length 6.0–6.7mm. FEMALE. Body length 7.0–7.5mm, wing length 7.3–7.8mm.

Head (Fig. 31) yellow. Frons as long as wide and parallel-sided, with a pair of pale brown stripes extending to ocellar triangle; ocellar triangle yellow, ocellar seta developed, longer than anterior fronto-orbital seta, anterior fronto-orbital seta shorter than posterior fronto-orbital seta. Gena about 1/9 height of eye. Antenna yellow, first flagellomere about 1.9 times longer than high; arista black except brown at base, plumose, with longest ray as long as height of first flagellomere. Proboscis yellow, with pale yellow and black setulae; palpus yellow, with black setulae.

Thorax (Fig. 34) yellow, with gray pruinosity. 0+3 dorsocentral setae, anteriormost postsutural dorsocentral seta far from scutal suture, acrostichal setulae in irregular six rows. Legs pale yellow. Fore femur with five posterior dorsal setae, four posterior ventral setae and ctenidium with 16 short setae; fore tibia with one dorsal preapical seta and one apical ventral seta. Mid femur with four anterior setae and one apical posterior seta; mid tibia with one strong dorsal preapical seta and three strong apical ventral setae. Hind femur with one preapical anterior dorsal seta; hind tibia with one dorsal preapical seta and one short apical ventral seta. Wing (Fig. 32) slightly yellow, basal margin of brown apical spot on R_{2+3} behind vertical level of crossvein dm-cu; brown apical spots on R_{2+3} , R_{4+5} and M_1 slightly confluent and forming pale brown connecting area between apical spots on R_{2+3} , R_{4+5} and M_1 ; brown median spot on R_{4+5} slightly fused with brown cloud-like spot on crossvein dm-cu; subcostal cell brown apically; costa with 2nd (between R_1 and R_{2+3}), 3rd (between R_{2+3} and R_{4+5}), and 4th (between R_{4+5} and M_1) sections in proportion of 3.2mm: 1.0mm: 0.8mm; r-m before middle of discal cell; ultimate and penultimate sections of M_1 in proportion of 2.0mm: 1.8mm; ultimate section of CuA_1 about 1/6 of penultimate. Haltere yellow.

Abdomen (Fig. 35) yellow, tergites 2–5 posterior margin blackish brown. Male genitalia (Figs. 36–40): syntergosternite circular. Epandrium broad in lateral view. Surstylus hairy and finger-like in lateral view, blunt apically in posterior view. Hypandrium H-shaped. Pregonite coniform, postgonite furcated into two coniform processes in lateral view. Phallus curved backward and acute apically in lateral view, with a pair of triangular submedial processes in ventral view. Phallapodeme longer than phallus.

Type material. **Holotype male**, China, **Chongqing**: Wuxi County, Yintiaoling Nature Reserve, Hongqi Management and Protection Station, 31°30'50"N, 109°49'22"E, elev. 1220 m, 2022. VIII. 20, leg. Xulong Chen. **Paratypes**: 15 males and 2 females, Yintiaoling, Linkouzi Management and Protection Station to Guimenguan, 31°28'36"N, 109°53'19"E, elev. 1349 m, 2022. VIII. 11, leg. Xulong Chen; 2 males and 1 female, Yintiaoling, Ganheba, 31°31'25"N, 109°49'32"E, elev. 1258 m, 2022. VI. 25, leg. Xulong Chen; 1 male and 2 females, Yintiaoling, Hongqi Management and Protection Station, Daqiaowan, 31°29'36"N, 109°49'0"E, elev. 1079m, 2022. VIII. 20, leg. Xulong Chen.

Etymology. The specific epithet is named for the type locality, Yintiaoling Nature Reserve.

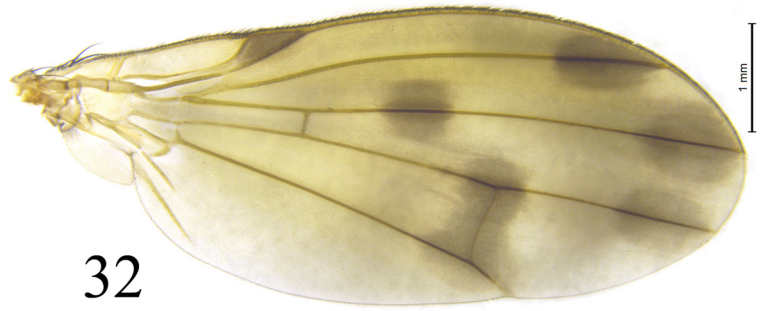
Distribution. China (Chongqing)

Remarks. The new species is very similar to *H. (H.) dagupingensis* Gao et Shi, 2019 from Shaanxi of China, but it can be separated from the latter by ctenidium with 16 short setae on fore femur; wing with brown apical spots on R_{2+3} , R_{4+5} and M_1 slightly confluent and forming pale brown connecting area between apical spots; brown median spot on R_{4+5} slightly fused with brown cloud-like spot on crossvein dm-cu. In *H. (H.) dagupingensis*, ctenidium with 12 short setae on fore femur; wing with brown apical spot on R_{2+3} separated from that on R_{4+5} ; brown medial spot on R_{4+5} separated from brown cloud on crossvein dm-cu.

The new species is somewhat similar to *H. (H.) wuxica* sp. nov. described here, but it can be separated from the latter by the fore femur with five posterior dorsal setae; mid femur with four anterior setae; brown median spot on R_{4+5} slightly fused with brown cloud-like spot on crossvein dm-cu. In *H. (H.) wuxica* sp. nov., the fore femur with seven posterior dorsal setae; mid femur with six anterior setae; brown median spot on R_{4+5} separated from brown cloud-like spot on crossvein dm-cu.



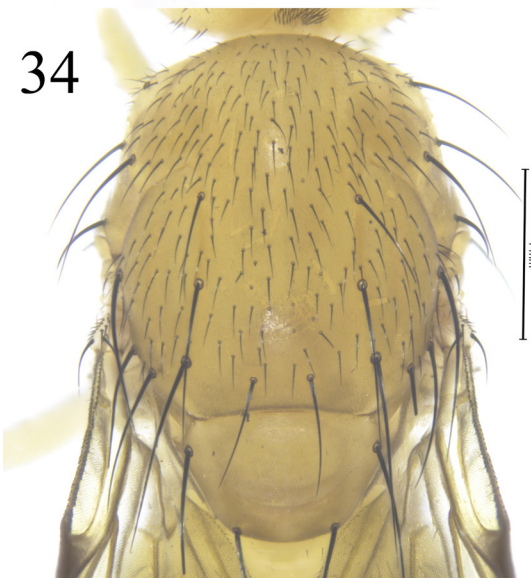
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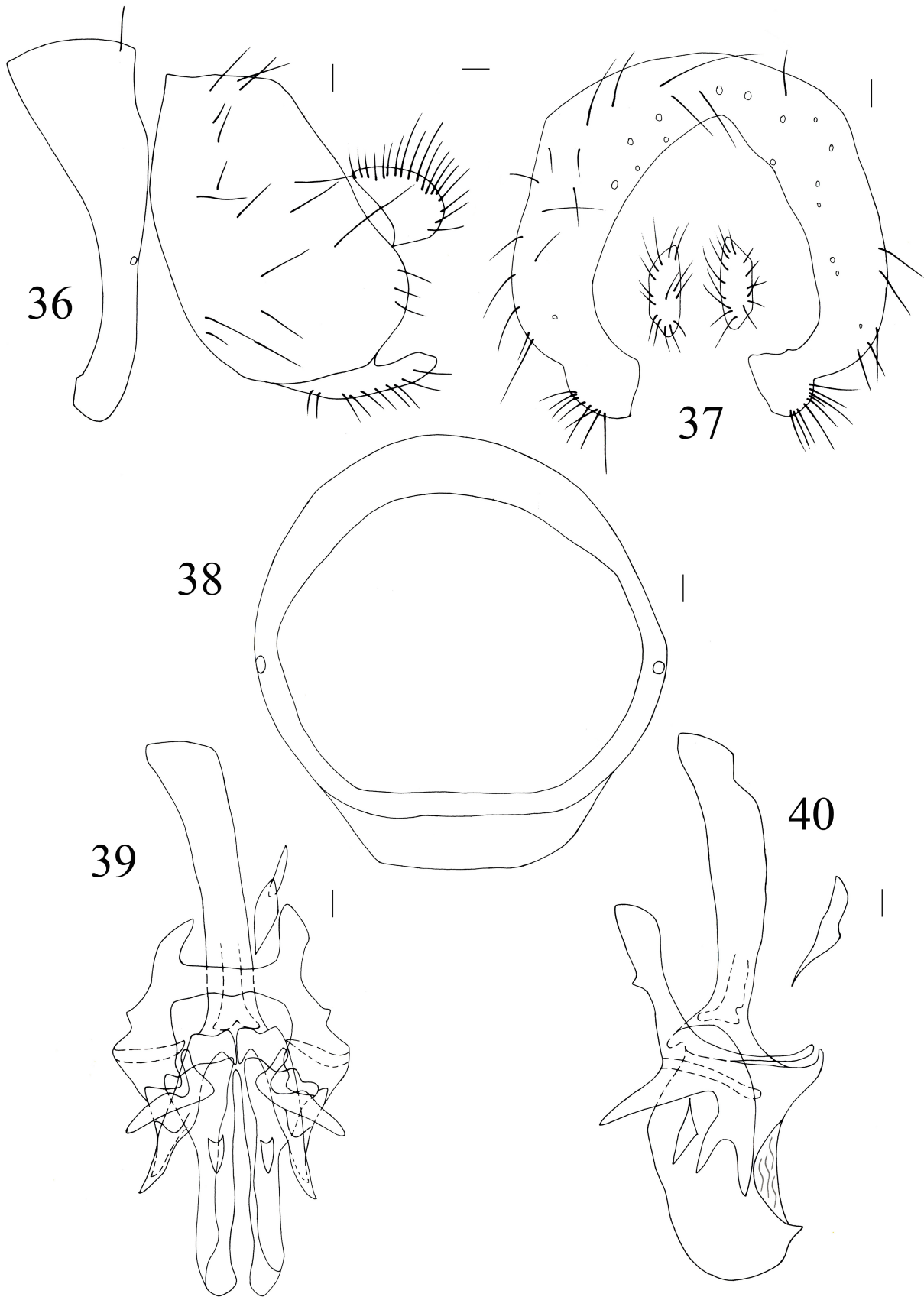


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FIGURES 31–35. *Homoneura (Homoneura) yintiaolingica* sp. nov. Male. 31. head, anterior view; 32. wing; 33. habitus, lateral view; 34. thorax, dorsal view; 35. abdomen, dorsal view.



FIGURES 36–40. *Homoneura (Homoneura) yintiaolingica* sp. nov. Male. 36. sytergosternite and epandrium, lateral view; 37. epandrial complex, posterior view; 38. sytergosternite, anterior view; 39. aedeagal complex, ventral view; 40. aedeagal complex, lateral view. Scale 0.5 mm.

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