

PREPRINT

Author-formatted, not peer-reviewed document posted on 06/02/2023

DOI: <https://doi.org/10.3897/arphapreprints.e101357>

Two new species of the bamboo-feeding planthopper genus *Neobelocera* Ding & Yang from China (Hemiptera, Fulgoromorpha, Delphacidae)

 Hongxing Li, Lin Yang, Xiang-Sheng Chen

Disclaimer on biological nomenclature and use of preprints

The preprints are preliminary versions of works accessible electronically in advance of publication of the final version. They are not issued for purposes of botanical, mycological or zoological nomenclature and **are not effectively/validly published in the meaning of the Codes**. Therefore, nomenclatural novelties (new names) or other nomenclatural acts (designations of type, choices of priority between names, choices between orthographic variants, or choices of gender of names) **should NOT be posted in preprints**. The following provisions in the Codes of Nomenclature define their status:

International Code of Nomenclature for algae, fungi, and plants (ICNafp)

Article 30.2: "An electronic publication is not effectively published if there is evidence within or associated with the publication that its content is merely preliminary and was, or is to be, replaced by content that the publisher considers final, in which case only the version with that final content is effectively published." In order to be validly published, a nomenclatural novelty must be effectively published (Art. 32.1(a)); in order to take effect, other nomenclatural acts must be effectively published (Art. 7.10, 11.5, 53.5, 61.3, and 62.3).

International Code of Zoological Nomenclature (ICZN)

Article: 21.8.3: "Some works are accessible online in preliminary versions before the publication date of the final version. Such advance electronic access does not advance the date of publication of a work, as preliminary versions are not published (Article 9.9)".

Two new species of the bamboo-feeding planthopper genus *Neobelocera* Ding & Yang from China (Hemiptera, Fulgoromorpha, Delphacidae)

Hong-Xing Li¹, Lin Yang^{2,3} & Xiang-Sheng Chen^{2,3}

1 Department of Light Industry & Chemical Engineering of Guizhou Light Industrial Technical College, Guiyang, Guizhou, 550025, China **2** Institute of Entomology, Guizhou University, Guiyang, Guizhou, 550025, China **3** The Provincial Special Key Laboratory for Development and Utilization of Insect Resources, Guizhou University, Guiyang, Guizhou, 550025, China

Corresponding author: Xiang-Sheng Chen (chenxs3218@163.com)

Abstract

Two new species of the bamboo-feeding genus *Neobelocera* Ding & Yang, 1986, *N. furcata* sp. nov. and *N. parvulua* sp. nov., are described and illustrated from China. A key for identifying the species is provided. Habitus photos for adults and illustrations of male genitalia are also given.

Key words: Fulgoromorpha, morphology, oriental region, taxonomy

Introduction

Ding and Yang (1986) established the genus *Neobelocera* with *N. asymmetrica* Ding & Yang, 1986 as its type species. It belongs to the tribe Tropidocephalini within the subfamily Delphacinae (Hemiptera, Fulgoroidea, Delphacidae) and is easily separated from other genera of this tribe by the following: antennae with first segment subsagittate, markedly flattened, a longitudinal carina down middle, the ventral apical angle longer than dorsal apical angle; when postclypeus viewed in profile, apical part of median carina bent at rounded angle, not at right angle (Ding et al. 1986; Chen 2003; Chen & Liang 2005; Hou & Chen 2010; Li et al. 2020). Currently *Neobelocera* includes 9 species, all recorded from China, viz. *N. asymmetrica* Ding & Yang, 1986, *N.*

zhejiangensis (Zhu, 1988), *N. hanyinensis* Qin & Yuan, 1998, *N. lanpingensis* Chen, 2003, *N. laterospina* Chen & Liang, 2005, *N. lii* Hou & Chen, 2010, *N. medogensis* Hu & Ding, 2014, *N. biprocessa* Li, Yang & Chen, 2020 and *N. russa* Li, Yang & Chen, 2020 (Hu & Ding 2014; Li et al. 2020).

Herein, two new species of *Neobelocera*, *N. furcata* sp. nov. and *N. parvulua* sp. nov., are described and illustrated from Guizhou and Yunnan province, China. A key for identifying the species is provided.

Materials and methods

The morphological terminology follows Yang and Yang (1986). Dry male specimens were used for the description and illustration. External morphology was observed under a stereoscopic microscope and characters were measured with an ocular micrometer. Color pictures for adult habitus were obtained by the KEYENCE VHX-6000 system. The genital segments of the examined specimens were macerated in 10% KOH and drawn from preparations in glycerin jelly using a Leica MZ 12.5 stereo microscope. Illustrations were scanned with a Canon CanoScan LiDE 200 and imported into Adobe Photoshop 6.0 for labeling and plate composition.

The type specimens of the new species are deposited in the Institute of Entomology, Guizhou University, Guiyang, China (GUGC).

Taxonomy

Genus *Neobelocera* Ding & Yang, 1986

(Figs 1–29)

Type species. *Neobelocera asymmetrica* Ding & Yang, 1986

Neobelocera Ding & Yang, in Ding et al. 1986: 420; Chen & Liang 2005: 374; Ding 2006: 196; Hou & Chen 2010: 40; Li et al. 2020: 3.

Diagnosis. Description from Hou et al. (2010: 40–41) “Head, including eyes wider or slightly narrower than pronotum (1.09–1.15:1). Vertex wider at base than long submedially about 1.9–3.0: 1, apical margin transversely broadened and only slightly produced medially. Y-shaped carina distinct, submedian carinae uniting at apex, apical

margin evenly rounding onto frons. Frons in median line longer than wide at widest part about 1.2–1.8: 1, widest above level of lower margin of eyes, lateral carinae roundly angulate above level of ocelli, then converging apically, median carina forked at extreme base. Eyes strongly emarginate on lower margin. Post-clypeus wider at base than frons at apex, in profile, apical part of median carina bend at rounded, not angled. Rostrum very short, only reaching mesotrochanters. Antennae reaching the level of median part of post-clypeus, with first segment subsagittate, markedly flattened, a longitudinal carina down middle, with the apex unequally bifurcate, the inner apical angle much longer than outer apical angle, in middle line shorter than second segment about 0.48–0.71: 1, second segment cylindrical or long oval, longer than wide about 2.5–3.5: 1. Pronotum equal to vertex medially (0.9–1.06: 1), posterior margin concave medially, with lateral carinae extending from near the posterolateral angle of the vertex to the posterior margin of the pronotum, running as anterolateral margin, curving inward and reaching hind margin, lateral discs concave. Mesonotum longer in middle line than vertex and pronotum combined (1.7–2.5: 1), median carina reaching the end of scutellum. Forewings relatively broad, longer in middle line than wide at widest part about 2.64–2.83: 1, widest at about apical 1/3, broadly acute at apex with a series of nearly connected transverse cross veins present at the posterior 1/3. Spinal formula of hind leg 5–6–4, post-tibial spur with an apical tooth. Basal segment of digitus longer than second and third combined (1.6–2.0: 1). Anal segment of male small, ring-like, ventral margin without processes or with a stout, very short process. Pygofer in lateral view with ventral margin longer than dorsal margin, posterior margin convex, straight or slightly sinuate, in caudal view with opening longer than wide, ventral margin concave or with medioventral process. Genital styles subparallel, slender, long. Phyllobase with a projection or absent. Aedeagus tubular, long, protruding processes of various lengths from apex. Suspensorium not recognizable. Diaphragm membranous, separated.”

Host plant. Bamboo.

Distribution. Oriental region (China).

Key to species (males) of *Neobelocera* Ding & Yang, 1986 (revised from Li et al. 2020)

1. Forewings yellowish white, hyaline, with a small dark brown marking on furcation of ScP (Hu & Ding 2014: fig. 10) *N. medogensis* Hu & Ding, 2014
- Forewings with blackish brown marking, of which veins with white spots or white short stripes at intervals (Figs 6, 21) 2
2. Frons with pale transverse band below level of lower margin of eyes (Figs 5, 20) 3
- Frons without transverse band (Chen & Liang 2005: fig. 10) 8
3. Ventral margin of pygofer with medioventral process (Figs 12, 24) 4
- Ventral margin of pygofer concave medially, without process 7
4. Anal segment (Fig. 26) with a long ventral process medially ... *N. parvulua* sp. nov.
- Anal segment (Fig. 9) without process 5
5. Genital styles with apex forked (Figs 13–14) *N. furcata* sp. nov.
- Genital styles with apex not forked 6
6. Frons with some short, yellowish white transverse stripes subapically; genae with 2–3 light brown spots (Li et al. 2020: fig. 3E); pygofer with medioventral processes short, median one slightly longer than lateral ones (Li et al. 2020: fig. 4D) *N. russa* Li, Yang & Chen, 2020
- Frons without yellowish white transverse stripe subapically; genae without light brown spot (Chen 2003: fig. 3); medioventral processes of pygofer with median one short, lateral ones very slender and long (Chen 2003: fig. 4) *N. lanpingensis* Chen, 2003
7. Phallus with basal half broad, compressed, apical half slender, tubular, acute at apex, with process at basal $\frac{1}{3}$ and node subapically; phyllobase with long straight spinous process basally and three processes apically (Li et al. 2020: fig. 2G) *N. biprocessa* Li, Yang & Chen, 2020
- Phallus slender, tubular, rounded at apex, without process and node; phyllobase slender, without process (Ding et al. 1986: figs 6–4) *N. asymmetrica* Ding & Yang, 1986

8. Median carina of vertex, pronotum, mesonotum and frons white bordered with dark brown to blackish brown (Chen & Liang 2005: figs 9–10) 9
 - Not as above, forewings at basal part and hind margin of apical part with blackish brown markings (Hou & Chen 2010: fig. 19); ventral margin of pygofer concave medially, lateral side of which each with a short process (Hou & Chen 2010: fig. 24) *N. lii* Hou & Chen, 2010
9. Pygofer with ventral margin concave medially, on lateral side each with a long, slender process (Chen & Liang, 2005: fig. 12); genital styles slender and long, with a spine-like process subapically (Chen & Liang 2005: figs 15–16) *N. laterospina* Chen, 2003
 - Pygofer with ventral margin without any process (Qin & Yuan 1998: fig. 1D) 10
10. Genital styles long, parallel and slightly sinuate, with inner apical angle acute, without process (Ding 2006: fig. 100C) *N. zhejiangensis* (Zhu, 1988)
 - Genital styles rather robust, apex acute, with branch lateral process terminating with 3–5 spinose processes (Qin & Yuan 1998: fig. 1F–G) *N. hanyinensis* Qin & Yuan, 1998

***Neobelocera furcata* sp. nov.**

(Figs 1–15)

Type materials. Holotype ♂, China: Guizhou, Wengan County (27°04'N, 107°51'E), on bamboo, 5 Aug. 2020, S.S. Lv leg.; paratypes, 1♂, 1♀, same data as holotype.

Etymology. The species epithet is derived from the Latin word '*furcata*', referring to the genital styles forked at apex.

Measurements. Body length including forewing: male 3.8–3.9 mm ($N = 2$), female 4.0 mm ($N = 1$).

Diagnosis. Frons (Fig. 5) with pale transverse band below level of lower margin of eyes, forewings (Fig. 6) with blackish brown marking, of which veins with white spots or white short stripes at intervals, anal segment (Fig. 9) without process, ventral margin of pygofer (Fig. 12) with 3 medioventral processes, genital styles (Figs 13–14)

with apex forked.

Description. *Coloration.* General coloration yellowish brown to dark brown (Figs 1–6). Vertex, pronotum, mesonotum (Fig. 3) dirty yellowish brown, with apex of scutellum yellowish white. Frons, genae and clypeus (Fig. 5) yellowish brown to dark brown, except broad transversal stripe below level of lower margin of eyes and narrow stripe of apex of frons yellowish white, along near apex of median carina of frons and inner margin of lateral carinae of genae with several short transversal stripes yellowish white. Eyes and ocelli (Figs 4–5) reddish brown. Antennae (Figs 3–5) yellowish brown to dark brown, except lateral margins of first segment and apex of second segment yellowish white. Legs (Fig. 5) yellowish white, with dark brown maculations. Forewing (Fig. 6) almost hyaline, along MP vein to apex with dark brown markings, veins dark brown, with white spots at intervals. Wings hyaline, with veins dark brown. Abdomen yellowish brown to dark brown.

Head and thorax. Head including eyes slightly narrower than pronotum, in profile obtusely rounding into frons (Figs 3–4). Vertex (Figs 3, 7) broad transversely, wider at base than long medially about 2.36: 1, width at apex narrower than at base about 1: 1.84, anterior margin produced medially, Y-shaped carina distinct. Frons (Figs 5, 8) in middle line longer than wide at widest part about 1.93: 1, widest above level of lower margin of eyes, median carina forked at extreme base. Postclypeus (Figs 5, 8) wider at base than frons at apex. Antennae (Figs 5, 8) reaching median part of postclypeus, basal segment shorter at midline than second segment about 1: 1.35, second segment long oval, somewhat compressed, longer than wide about 2.28: 1. Pronotum (Figs 3, 7) tricarinate, with anterior margin truncate, posterior margin incised strongly, lateral carinae running near anterolateral margin, then curving inward and reaching hind margin. Mesonotum (Figs 3, 7) tricarinate, longer in midline than vertex and pronotum together about 2.16: 1, median carina reaching end of scutellum. Forewing (Fig. 6) longer in middle line than wide at widest part about 3.47: 1.

Male genitalia. Anal segment (Fig. 9) small, ring-like, without process. Pygofer (Figs 9–10, 12) in profile much longer ventrally than dorsally, in posterior view with opening longer than wide, ventral margin with 3 medioventral processes, lateral ones

short, tapering, median one forked at apex, with 4 processes on each side and the middle two much smaller. Genital styles (Figs 13–14) moderately long, forked at apex, outer angle about twice as long as inner angle. Aedeagus (Fig. 15) with phyllobase, phallus tubular, long, expanded at base, bent ventrad medially, broad and forked at apex, curved sharply to the left apically. Phyllobase slender, tubular, arising from base of aedeagus, running dorsad, then curving caudad, after median part, turned left then ventrad, tapering apically.

Host plant. Bambusoideae.

Distribution. China (Guizhou).

Remarks. This new species is similar to *N. russa* Li, Yang & Chen, 2020, but can be distinguished from the latter by the following features: (1) forewing (Fig. 6) along MP vein to apex with dark brown markings (forewing (Li et al. 2020: fig. 3F) with apical part from transverse veins to apex with dark brown markings in *N. russa*); (2) medioventral processes of pygofer (Fig. 12) with median one forked at apex, with 4 processes on each side and the middle two much smaller (medioventral processes of pygofer (Li et al. 2020: fig. 4D) with median one not forked at apex, without process on each side in *N. russa*); (3) apex of phallus (Fig. 15) with two processes (apex of phallus (Li et al. 2020: fig. 4G) with four processes in *N. russa*).

***Neobelocera parvulua* sp. nov.**

(Figs 16–29)

Type material. Holotype: ♂, **China:** Yunnan, Jinghong County (21°58'N; 100°68'E), 19 Apr. 2020; H.X. Li leg.; paratypes, 8♂♂, 5♀♀, same data as holotype.

Etymology. The species epithet is derived from the Latin word ‘*parvulua*’, referring to the body is small.

Measurements. Body length including forewing: male 2.9–3.1 mm ($N = 8$), female 2.9–3.3 mm ($N = 5$).

Diagnosis. Frons (Fig. 20) with pale transverse band below level of lower margin of eyes, forewings (Fig. 21) with blackish brown marking, of which veins with white

spots or white short stripes at intervals, anal segment (Fig. 26) with a long ventral process medially, ventral margin of pygofer (Fig. 24) with medioventral process.

Description. *Coloration.* General coloration yellowish white to dark brown (Figs 16–21). Vertex (Fig. 18) yellowish white. Frons (Fig. 20) with basal half yellowish brown to brown, apical half yellowish white, with two triangular markings at apex. Genae (Fig. 20) dark brown, except longitudinal stripes below level of lower margin of ocelli yellowish white. Clypeus (Fig. 20) yellowish brown, except longitudinal stripes near lateral margin dark brown. Eyes (Figs 18–20) yellowish white to dark brown, ocelli (Fig. 19) reddish brown. Antennae (Figs 18–20) yellow to dark brown. Pronotum (Fig. 20) yellowish white to dark brown, median carina yellowish white. Mesonotum (Fig. 20) yellowish brown to dark brown, apex of scutellum yellowish white. Legs (Figs 16–20) yellowish white, with dark brown maculations. Forewing (Fig. 21) light yellowish white, basal part near costal margin with big infusate markings, and apical part from transverse veins to apex with dark brown markings, veins with white spots at intervals. Wings hyaline with veins dark brown. Abdomen yellowish brown to dark brown.

Head and thorax. Head including eyes slightly narrower than pronotum, in profile obtusely rounding into frons (Figs 18–19). Vertex (Figs 18, 22) broad transversely, wider at base than long medially about 2.72: 1, width at apex narrower than at base about 1:1.81, anterior margin produced medially, Y-shaped carina distinct. Frons (Figs 20, 23) in middle line longer than wide at widest part about 1.68: 1, widest above level of lower margin of eyes, median carina forked at extreme base. Postclypeus (Figs 20, 23) wider at base than frons at apex. Antennae (Figs 20, 23) reaching median part of postclypeus, basal segment shorter at midline than second segment about 1: 1.38, second segment long oval, somewhat compressed, longer than wide about 2.30: 1. Pronotum (Figs 18, 22) tricarinate, with anterior margin truncate, posterior margin incised strongly, lateral carinae running near anterolateral margin and reaching hind margin. Mesonotum (Figs 18, 22) tricarinate, longer in midline than vertex and pronotum together about 2.03: 1, median carina reaching end of scutellum. Forewing (Fig. 21) longer in middle line than wide at widest part about 2.81: 1.

Male genitalia. Anal segment (Figs 24–25) ring-like, ventral margin with a long

process medially, bent ventrad medially. Pygofer (Figs 24–25) in profile much longer ventrally than dorsally, in posterior view with opening longer than wide, ventral margin with medioventral process, three branched medially, right branch much longer than other two, sinuate, median branch nearly equal to left branch, left branch with a small process near apex. Genital styles (Figs 27–28) stout, short, bent near middle, tapering apically. Aedeagus (Fig. 29) with phyllobase, phallus tubular, long, forked at apex, phyllobase slender, tubular, arising from base of aedeagus, two branched, longer branch bend ventrally near apex, shorter branch straight.

Host plant. Bambusoideae.

Distribution. China (Yunnan).

Remarks. This new species is similar to *N. biprocessa* Li, Yang & Chen, 2020, but can be distinguished from the latter by the following features: (1) anal segment of male (Figs 24–26) with a long ventral process medially (anal segment (Li et al. 2020: fig. 2D) without process in *N. biprocessa*); (2) pygofer (Fig. 24) with medioventral process (pygofer (Li et al. 2020: fig. 2D) without medioventral process in *N. biprocessa*); (3) genital styles (Figs 27–28) stout and short (genital styles (Li et al. 2020: fig. 2H) and slender and long in *N. biprocessa*).

Acknowledgments

The authors are grateful to collector for collecting specimens. This work was supported by the National Natural Science Foundation of China (No. 32060343); the Science and Technology Support Program of Guizhou Province (No. 20201Y129); the Program of Excellent Innovation Talents, Guizhou Province (No. 20154021); and the Research Project of Guizhou Light Industrial Technical College (No. 22QYBS06).

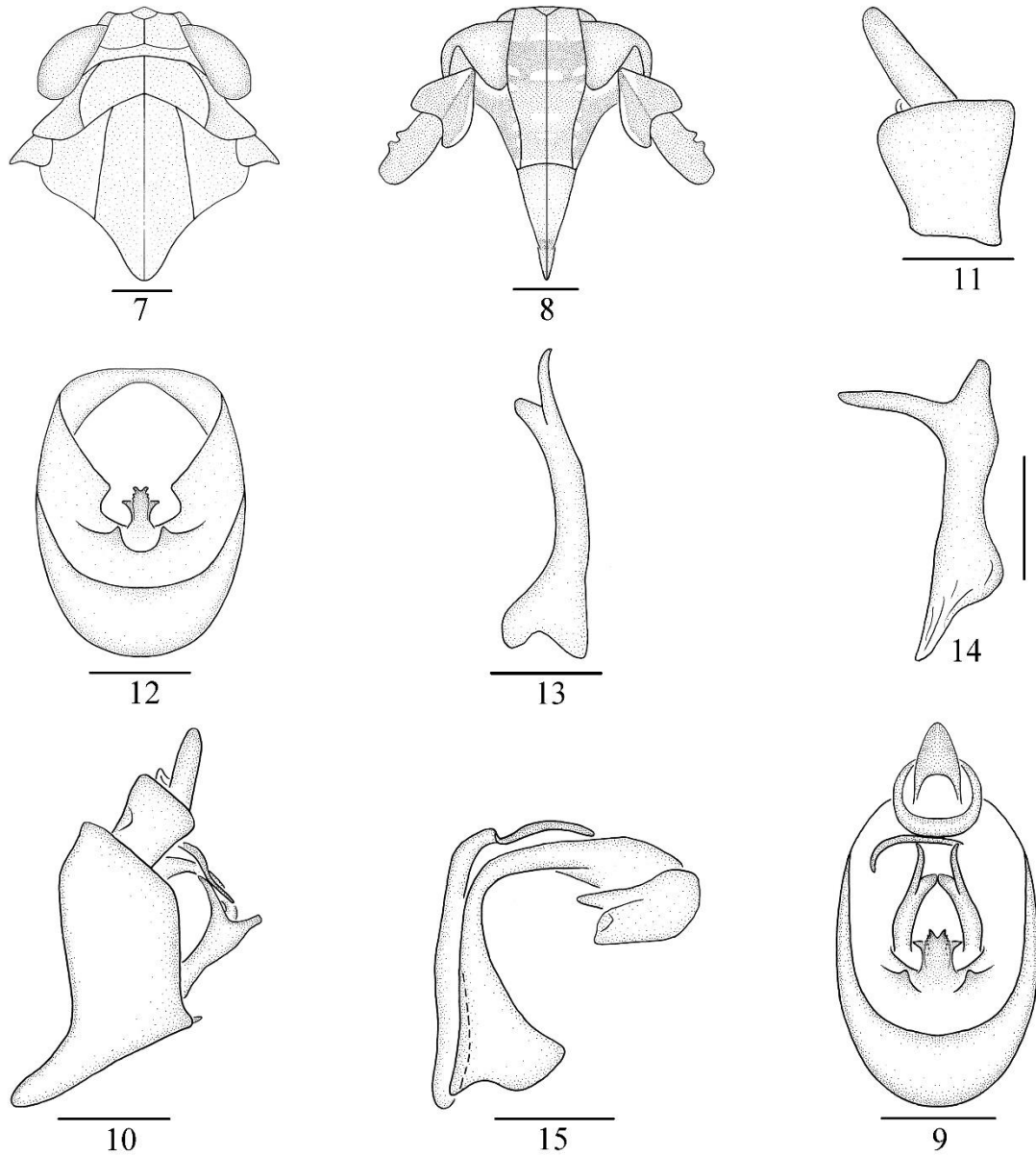
References

- Chen XS (2003) A new species of the genus *Neobelocera* (Homoptera: Delphacidae) from China. *Zootaxa* 290: 1–4.
- Chen XS, Liang AP (2005) A taxonomic study of the genus *Neobelocera* (Homoptera, Fulgoroidae, Delphacidae). *Acta Entomologica Sinica* 30: 374–378.

- Ding JH (2006) Fauna Sinica Insecta. Vol. 45. Homoptera Delphacidae. Science Press, Beijing, xx + 775 pp.
- Ding JH, Yang LF, Hu CL (1986) Descriptions of new genera and species of Delphacidae attacking bamboo from Yunnan Province, China. Acta Entomologica Sinica 29 (4): 415–423. <https://doi.org/10.16380/j.kcxb.1986.04.016>
- Hou XH, Chen XS (2010) Review of the Oriental bamboo delphacid genus *Neobelocera* Ding & Yang (Homoptera: Fulgoromorpha: Delphacidae) with the description of one new species. Zootaxa 2387: 39–50.
- Hu CL, Ding JH (2014) A new species of *Neobelocera* Ding & Yang (Homoptera: Delphacidae: Delphacinae: Tropidocephalini) from China, with a key to species of the genus. Zootaxa 3784 (2): 196–199. <https://doi.org/10.11646/zootaxa.3784.2.9>
- Li HX, Yang L, Chen XS (2020) Two new species of the bamboo-feeding planthopper genus *Neobelocera* Ding & Yang, 1986 from China (Homoptera, Fulgoroidea, Delphacidae). European Journal of Taxonomy 641: 1–14. <https://doi.org/10.5852/ejt.2020.641>
- Qing DZ, Yuan F (1998) A new species of the genus *Neobelocera* (Homoptera: Delphacidae). Entomotaxonomia 20 (3): 168–170.
- Yang JT, Yang CT (1986) Delphacidae of Taiwan (I) Asiracinae and the tribe Tropidocephalini (Homoptera: Fulgoroidea). Taiwan Museum Special Publication 6: 64–76.



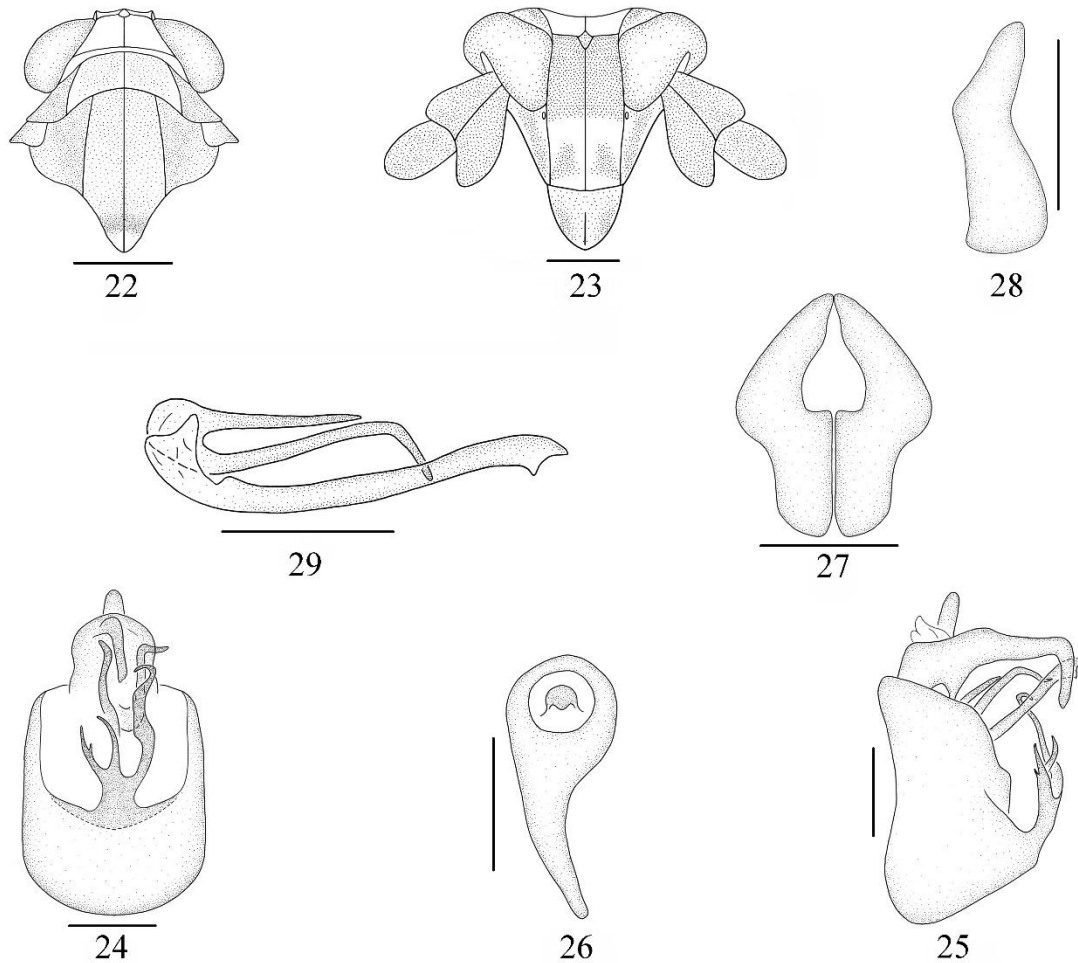
Figures 1–6. *Neobelocera furcata* sp. nov. 1 Male adult, dorsal view 2 Same, lateral view 3 Head and thorax, dorsal view 4 Same, lateral view 5 Face 6 Forewing. Scale bars: 0.5 mm (1–6).



Figures 7–15. *Neobelocera furcata* sp. nov. **7** Head and thorax, dorsal view **8** Face **9** Male genitalia, posterior view **10** Same, lateral view **11** Anal segment, lateral view **12** Pygofer, posterior view **13** Genital style, posterior view **14** Same, lateral view **15** Aedeagus, lateral view. Scale bars: 0.2 mm (7–10, 12); 0.1 mm (11, 13–15).



Figures 16–21. *Neobelocera parvulua* sp. nov. 1 Male adult, dorsal view 2 Same, lateral view 3 Head and thorax, dorsal view 4 Same, lateral view 5 Face 6 Forewing. Scale bars: 0.5 mm (16–17, 21); 0.3 mm (18–20).



Figures 22–29. *Neobelocera parvulua* sp. nov. **22** Head and thorax, dorsal view **23** Face **24** Male genitalia, posterior view **25** Same, lateral view **26** Anal segment, dorsal view **27** Genital style, posterior view **28** Same, lateral view **29** Aedeagus, lateral view. Scale bars: 0.2 mm (**22–26, 29**); 0.1 mm (**27–28**).