Genus *Parabolopona* Matsumura from China (Hemiptera: Cicadellidae: Drabescini) with descriptions of three new species

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Abstract: The leafhopper genus *Parabolopona* Matsumura comprises 13 previously described species, of which 11 species are recorded from China. Three new species *Parabolopona cochliapophysis*, *P. tibetensis* and *P. xianxiaensis* **spp. nov.** are here described from China, and the female genitalia with pregenital sternite of *P. basispina* is added and illustrated. An updated checklist and key to males of all species are provided.

Key words: Auchenorrhyncha; Deltocephalinae; Paraboloponina; taxonomy

中国脊翅叶蝉属分类并记三新种（半翅目：叶蝉科：胫槽叶蝉族）

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摘要：脊翅叶蝉属*Parabolopona* Matsumura世界已知13种，中国记录11种。本文记述分布中国的脊翅叶蝉属3新种：*Parabolopona cochliapophysis*, *P. tibetensis* 和 *P. xianxiaensis* **spp. nov.**，补充描记了*P. basispina*雌虫的生殖前节和雌性生殖器特征，提供了脊翅叶蝉属世界名录和检索表。

关键词：头喙亚目；角顶叶蝉亚科；脊翅叶蝉亚族；分类

Introduction

The leafhopper genus *Parabolopona* Matsumura, 1912 was established based on the type species *Parabolocratus guttatus* Uhler. Webb (1981) revised the genus and added three species: *P. chinensis*, *P. ishihari* and *P. luzonensis* from Asia. Two Chinese species, *P. yangi* and *P. cygnea*, were described separately by Zhang *et al*. (1995) and Cai & Cen (1999). Zhang & Webb (1996) reviewed this genus from the Asian and Pacific regions. Subsequently, the following seven species, *P. quadrispinosa*, *P. mutabilis*, *P. webbi*, *P. basispina*, *P. robustipenis*, *P. zhangi* and *P. yunnanensis*, were described and illustrated (Shang *et al*. 2006; Ohara & Kogure 2012; Zahniser & Dietrich 2013; Dai *et al*. 2016; Meshram *et al*. 2016; Yu *et al*. 2019; Xu & Zhang 2020). In this study, three new species: *Parabolopona cochliapophysis* **sp. nov.** from Guizhou, *P. tibetensis* **sp. nov.** from Tibet and *P. xianxiaensis* **sp. nov.** from

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Zhejiang are described and the female of *P. basispina* is illustrated for the first time. Until now, 16 species of *Parabolopona* are provided with the checklist and key to males of all species.

Material and Methods

Morphological terminology followed from Webb (1981) and Zhang & Webb (1996). Specimens were dissected and observed by the stereo microscope (Zoom 2000, Leica) and illustrated using an advanced stereo microscope (Discovery V20 and AxioCam ICc5, Zeiss) at the Insect Systematics and Biodiversity Platform, College of Plant Protection, Northwest A&F University (NWAFU). Holotype specimen of *Parabolopona tibetensis* was loaned and deposited in the Institute of Zoology, Chinese Academy of Science, Beijing (IZCAS), and other specimens are deposited in the Northwest A&F University, Shaanxi.

Taxonomy

Parabolopona Matsumura, 1912

Type species. *Parabolocratus guttatus* Uhler.

Diagnosis. Body pale stramineous. Crown produced, slightly foliaceous, slightly narrower than pronotum and as long as pronotum, vertex shagreen with two fine transverse carinae on anterior margin, median length longer than half of distance between eyes; coronal suture distinct. Ocelli situated on anterior margin, two or three times their own diameter from adjacent eyes. Face depressed along anterior margin between antennal pits, laterofrontal sutures absent; gena incurved below eye; clypeal suture nearly straight, apex of anteclypeus expanded; lora slightly broader than base of anteclypeus. Pronotum with anterior margin protruding forward slightly and posterior margin slightly concave, with carina on lateral margin. Mesonotum slightly longer than pronotum, scutellar suture arcuate. Forewing both with A1-A2 crossvein and A1 crossvein between A1 and claval suture present.

Forefemur setal formulation. AM1 present, stout close to middle. AV1 present, fine long seta; with AV short fine seta. Fore tibia with AD : PD = 1 : 4. Metafemur macrosetae 2 : 2 : 1. Connective Y-shaped with stem extended posteriorly. Aedeagus disassociated from connective by membrane. Aedeagus without process, with unpaired single process or two pairs of processes distally or arising from base.

Remarks. This genus differs from other genera of the subtribe Paraboloponina by the foliaceous head, the membranous connection between the aedeagus and connective, and connective with the stem extended posteriorly. Currently 16 species of *Parabolopona* are distributed in the Old World, mainly from China, including 14 species.

Checklist of the genus *Parabolopona*

1. *P. basispina* Dai, Qu & Yang, 2016: 394 — China (Hainan)
2. *P. chinensis* Webb, 1981: 45 — China (Shaanxi, Hubei, Sichuan)
3. *P. cochliapophysis* **sp. nov.** — China (Guizhou)
4. *P. cygnea* Cai & Shen, 1999: 28 — China (Shanxi, Henan, Guizhou)
5. *P. guttata* (Uhler, 1896: 291) — China (Taiwan); Japan; Philippines

6. *P. ishihari* Webb, 1981: 45 — China (Beijing, Shanxi, Shaanxi, Hubei, Hunan, Hainan, Guangxi, Yunnan); Japan
7. *P. luzonensis* Webb, 1981: 46 — China (Zhejiang, Guizhou); Philippines
8. *P. mutabilis* Ohara & Kogure, 2012: 205 — Japan
9. *P. quadrispinosa* Shang & Zhang, 2006: 33 — China (Zhejiang, Fujian, Guangxi, Yunnan)
10. *P. robustipenis* Yu, Webb, Dai & Yang, 2019: 50 — China (Hainan)
11. *P. tibetensis* **sp. nov.** — China (Tibet)
12. *P. webbi* Zahniser & Dietrich, 2013: 181 — China (Taiwan)
13. *P. xianxiaensis* **sp. nov.** — China (Zhejiang)
14. *P. yangi* Zhang, Chen & Shen, 1995: 11 — China (Guangdong)
15. *P. yunnanensis* Xu & Zhang, 2020 — China (Yunnan)
16. *P. zhangi* Meshram, Shashank & Srinivasa, 2016: 184, 185 — India

Key to species of *Parabolopona* (♂)

1. Pygofer lobe with ventral process ····· 2
- . Pygofer lobe without ventral process ····· 3
2. Pygofer lobe with posterior margin truncated (Fig. 2G) ····· *P. tibetensis* **sp. nov.**
-. Pygofer lobe with posterior margin narrowly rounded and tapered apically ····· *P. quadrispinosa*
3. Aedeagus without process ····· *P. yangi*
-. Aedeagus with process ····· 4
4. Aedeagus with unpaired ventral process ····· 5
-. Aedeagus with paired processes ····· 7
5. Aedeagus with pair of apical processes ····· *P. webbi*
-. Aedeagus without pair of apical processes ····· 6
6. Style with apex moderately bent laterally; aedeagus with basal ventral single process moderately long and spiral-shaped in middle (Figs 1P, 1T) ····· *P. cochliapophysis* **sp. nov.**
-. Style with apex strongly bent laterally; aedeagus with ventral single process short and straight ····· *P. mutabilis*
7. Aedeagus with paired apical or subapical processes ····· 8
-. Aedeagus with paired processes arising from base or sub median ····· 13
8. Connective with apex slightly expanded and upturned laterally or branched ····· 9
-. Connective with apex straight and tapering ····· 11
9. Connective with apex branched ventrally; aedeagal shaft robust ····· *P. robustipenis*
-. Connective with apex expanded; aedeagal shaft not robust ····· 10
10. Connective with apex expanded and sinuate laterally; aedeagal shaft with a pair of lateral triangular flanges in ventral view ····· *P. cygnea*
-. Connective with apex straight laterally; aedeagus with shaft arched posteroventrad in lateral view and shaft without flanges ····· *P. guttata*
11. Aedeagus only with paired apical processes; connective with posterior process nearly straight or curved dorsally ····· 12
-. Aedeagus with paired processes near midlength; connective with posterior process curved ventrad bearing numerous setae apically ····· *P. yunnanensis*
12. Aedeagus with apical processes with small basal projections and directed towards base of shaft laterally ····· *P. chinensis*

-. Aedeagus with apical processes extended laterad and directed away from the shaft laterally ·· *P. ishihari*
13. Connective with stem extended posteriorly slightly longer than pygofer····· 14
-. Connective with stem extended posteriorly shorter than pygofer····· 15
14. Apex of connective with numerous short setae; aedeagus with paired divergent processes near base·····
·····*P. luzonensis*
-. Apex of connective without setae; aedeagus with paired parallel processes along shaft·····*P. zhangi*
15. Pygofer with lobe produced posteriorly 1.5× times longer than subgenital plates; aedeagus with adjacent paired processes smooth and straight (Figs 3F, 3Q)·····*P. xianxiaensis* **sp. nov.**
-. Pygofer with lobe produced posteriorly slightly longer than subgenital plates; aedeagal paired basal processes sinuated with spine near base in ventral view (Figs 4H, N)····· *P. basispina*

1. ***Parabolopona cochliapophysis* sp. nov.** (Fig. 1)

Length. Male 8.2–8.3 mm; female 8.3–8.4 mm.

Head with greenish longitudinal stripes extended from anterior margin across pronotum to mesonotum near the middle. Crown with B-shaped greenish markings and paired clear spots near posterior margin. Pronotum with indistinct brownish markings near anterior margin and oblique transverse striations. Mesonotum with basal triangles grey. Forewing pale yellowish with smoky markings on apical cells and some scattered brown symmetrical spots on veins. Legs with setal sockets dark brown.

Ocelli two times their own diameter from adjacent eyes. Fore femur setal formulation: IC = 14.

Male genitalia. Pygofer broad, lobe tapered posteriorly to narrow rounded apex, curved mesad at apex, with numerous macrosetae. Subgenital plate broad rhomboidal in shape, apex digitate. Style elongate, with apex strongly bent laterad, inner margin with a protuberance; preapical lobe well-developed, acute rectangular, basal arms quite elongate. Connective slender, arms slightly divergent, stem strongly extended posteriorly, equal in length to pygofer, with numerous fine setae and sulcate on dorsal surface, preapically spear-shaped. Aedeagus moderately stocky and constricted to oblate, with dorsal apodeme developed and broad, apex bifurcate in caudal and anterior view; shaft curved dorsally, apex strongly expanded in lateral view, with a single basal ventral process spiral shaped in middle, nearly as long as shaft, gonopore large, apical in ventral surface.

Female genitalia. Abdominal sternite VII expanded strongly posteriorly, with posterior margins emarginate and forming a petaloid sternite, just a small V-shaped concave in middle (Fig. 1V).

Holotype. ♂, **China**, Guizhou, Jiangkou County, Taiping, Kaima village, 02-VIII-2014, 27.8427N, 108.7749E, 540 m, fogging, coll. Xianjin PENG (IZCAS). **Paratypes.** 1♂2♀, same data as holotype (IZCAS).

Etymology. The specific name “cochliapophysis” refers to the spiral-shaped ventral process of the aedeagus.

Remarks. Besides of external characters of coloration and shape, this species resembles *P. webbi* and *P. mutabilis* in the characters of valve and subgenital plates, and aedeagus with a single ventral process, but can be distinguished from the former by the expanded apex of the aedeagus without paired processes, and from the latter by its spiral-shaped ventral aedeagal process.

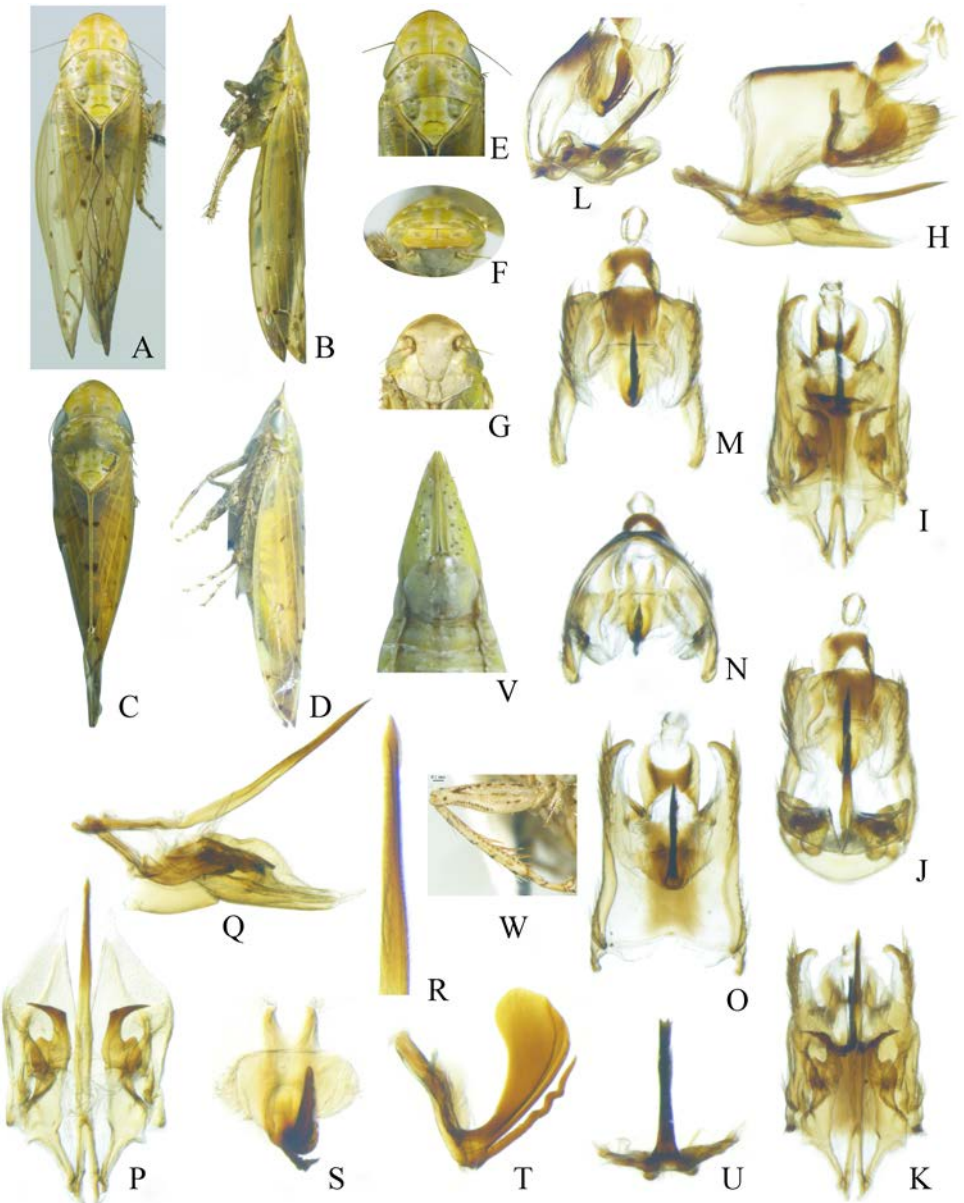

Figure 1. *Parabolopona cochliapophysis* **sp. nov.** A, B. Male, dorsal and lateral views; C, D. Female, dorsal and lateral views; E, F. Head of male, dorsal, anterodorsal and lateral views; G. Face; H–K. Male genitalia, lateral, dorsal, caudal and ventral views; L. Amplification of pygofer, laterocaudal view; M–O. Aedeagus and pygofer, caudal, anterior and ventral views; P, Q. Valve, subgenital plates, styli and connective, dorsal and lateral views; R. Apex of connective, dorsal view; S–U. Aedeagus, caudal, lateral and ventral, views; V. Sternite VII of female, ventral view; W. Fore leg, anterior view.

2. ***Parabolopona tibetensis*** **sp. nov.** (Fig. 2)

Length. Male 8.0 mm.

Body pale stramineous. Head without longitudinal stripes. Mesonotum with basal triangles dark brown. Forewing pale yellowish with smoky markings on apical cells and some scattered brown spots on veins. Leg with setal sockets dark brown.

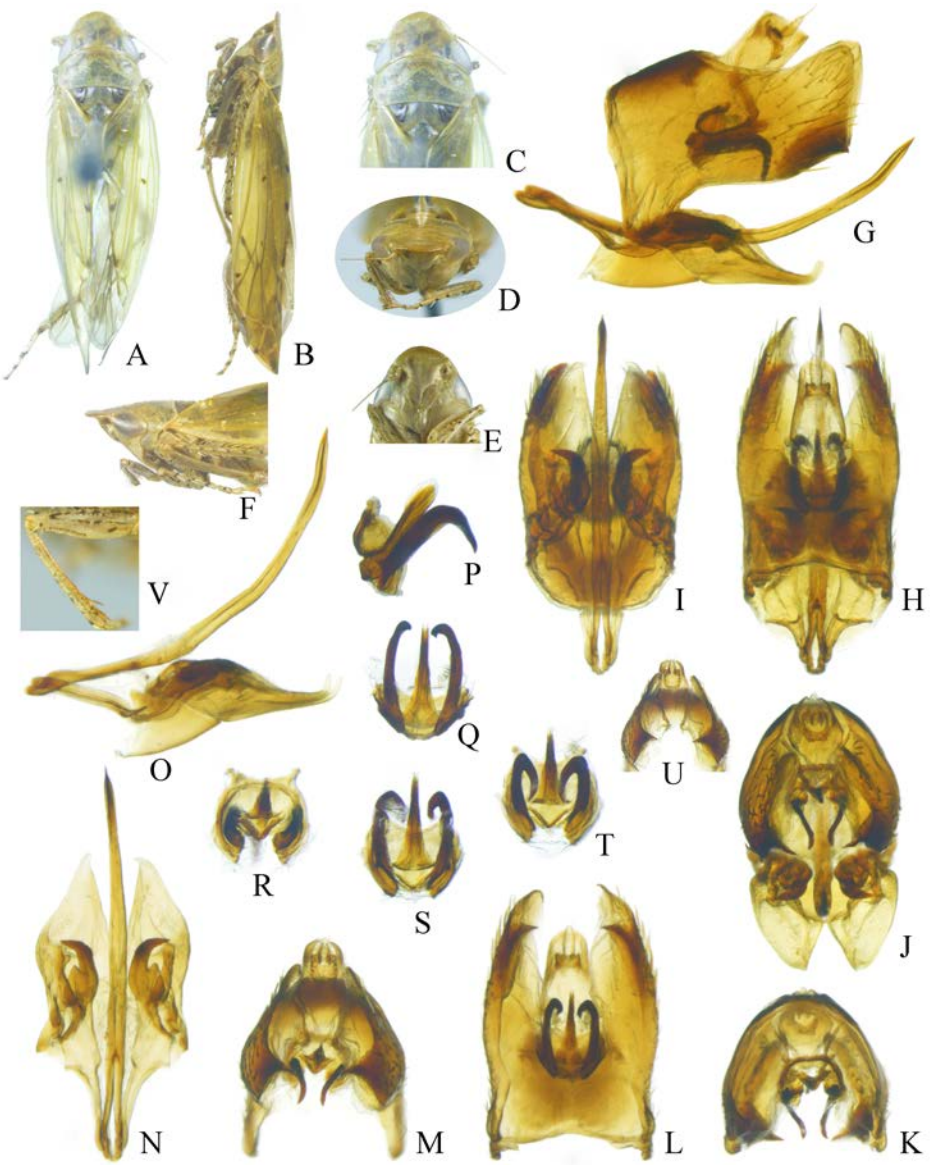

Figure 2. *Parabolopona tibetensis* **sp. nov.** A, B. Male, dorsal and lateral views; C, D, F. Head of male, dorsal, anterodorsal and lateral views; E. Male face; G–J. Male genitalia, lateral, dorsal, ventral and caudal views; K–M. Aedeagus and pygofer, anterior, ventral and caudal views; N, O. Valve, subgenital plates, styli and connective, dorsal and lateral views; P–T. Aedeagus, lateral, ventral, anterior, dorsal and caudal views; U. Appendages of pygofer, caudal view; V. Forefemur, anterior view.

Ocelli three times their own diameter from adjacent eyes. Fore femur setal formulation:

IC = 12.

Male genitalia. Pygofer broad, lobe with posterior margin truncate with acute posteroventral process, with numerous macrosetae preapically. Valve broad triangular. Subgenital plates broad triangular, apex digitate with several short setae in middle. Style elongate, with apex strongly bent laterad, preapical lobe well-developed, acute angular, basal arms quite elongate. Connective slender, arms nearly parallel, stem extended posteriorly more than the length of pygofer, apex acute with sculptures. Aedeagus moderately stout with dorsal apodeme developed, apex bifurcate in anterior view; shaft simple and straight, directed posteriorly, apex expanded in lateral view, with paired stout processes arising from base and curved ventrad subapically, a V-shaped sclerite (paraphysis) articulated with base of shaft, gonopore small, apical.

Holotype. ♂, **China**, Tibet, Motuo County, Beibeng, Jiefang bridge, 17-VI-2016, 29.2432N, 95.1673E, 773 m, coll. Hongbin LIANG (IZCAS).

Etymology. The specific name “tibetensis” refers to the collecting locality of Tibet.

Remarks. This species is similar to *P. zhangi* in having the connective stem extended posteriorly longer than the length of pygofer and the style apex and basal arms long, but can be distinguished from the shape of the basal processes of the aedeagus.

3. ***Parabolopona xianxiaensis* sp. nov.** (Fig. 3)

Length. Male 8.0 mm.

Coloration. Body pale stramineous. Head with greenish patches. Mesonotum tinged with longitudinal brownish band in middle anterad of scutellar suture and basal triangles pale greenish. Forewing pale yellowish with smoky markings on apical cells and some scattered brown spots on veins. Leg with setal bases brownish.

Fore femur setal formulation: IC = 12.

Male genitalia. Pygofer elongate, sclerotized dorsally, lobe produced posteriorly 1.5× times longer than length of subgenital plates, narrowly rounded to apex, with numerous macrosetae. Valve broad triangular. Subgenital plate broad with outer margin straight, subapically constricted to apex, apex digitate with several short setae near outer margin. Style elongate, with apex slightly sinuate, preapical lobe well-developed, rectangular. Connective slender, with stem extended posteriorly, tapered to apex, apex with sculptures. Aedeagus with dorsal apodeme developed; shaft short and curved dorsally in lateral view, with paired long processes simple, tapered to acute apex, arising from atrium dorsad of shaft and slightly arcuate, gonopore small, apical.

Holotype. ♂, **China**, Zhejiang, Quzhou, Xianxialing, 28-V-2017, coll. Shuanghu LIN (NWAFU).

Etymology. The species is named for its type locality “Xianxialing” mountains of Zhejiang.

Remarks. This species is similar to *P. basispina* in the structure of the connective and aedeagus, but differs in the more strongly produced pygofer, and more elongate, acuminate aedeagal processes relative to the shaft.

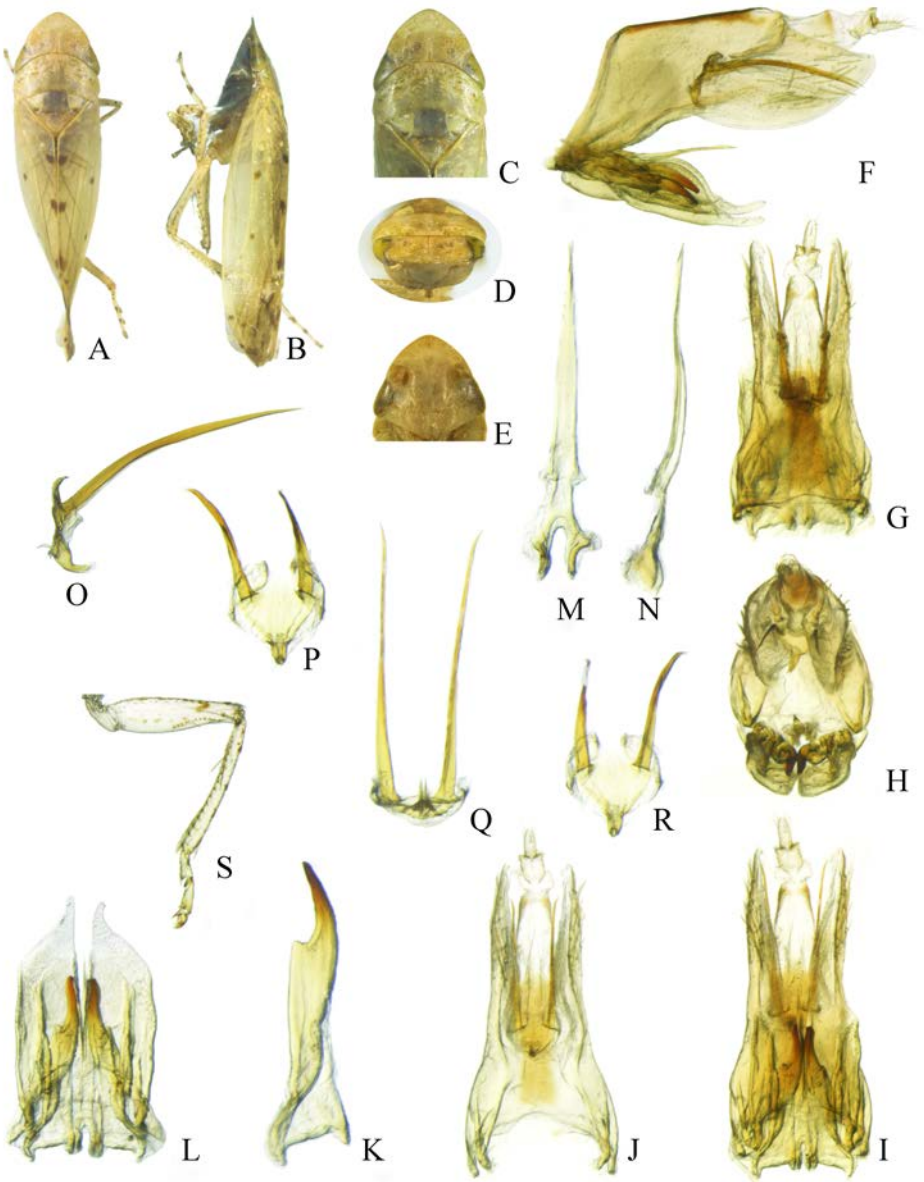

Figure 3. *Parabolopona xianxiaensis* **sp. nov.** A, B. Male, dorsal and lateral views; C, D. Head, dorsal and anterodorsal views; E. Face; F–I. Male genitalia, lateral, dorsal, caudal and ventral views; J. Aedeagus and pygofer, ventral view; K. Style, dorsal view; L. Valve, subgenital plates, styli and connective, ventral view; M, N. Connective, ventral and lateral views; O–R. Aedeagus, lateral, anterior, ventral and caudal views; S. Forefemur and foretibia, anterior view.

4. ***Parabolopona basispina* Dai, Qu et Yang, 2016** (Fig. 4)

Parabolopona basispina Dai, Qu et Yang, 2016: 394.

Length. Male 6.0 mm; female 7.0 mm.

Chaetotaxy. Fore femur setal formulation: IC = 12 (Fig. 4O).

Female genitalia. Abdominal sternite III with several white macrosetae in middle (Fig. 4F) and sternite VII with posterior margins intensely projecting as “Poisson curve” backward in middle (Fig. 4G). 1st valvulae with dorsal and ventral sculpturing strigate (Fig. 4Q) and 2nd valvulae with dorsal teeth very fine one quarter distance to apex (Fig. 4R).

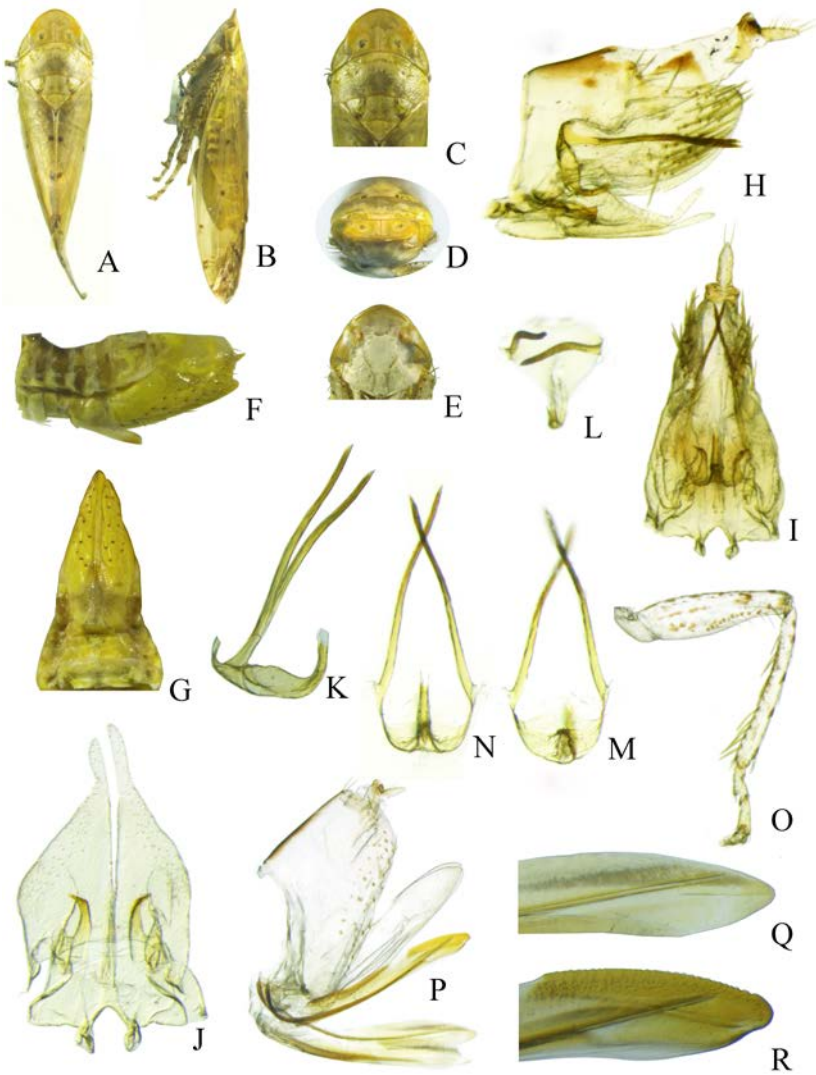

Figure 4. *Parabolopona basispina*. A, B. Habitus of female., dorsal and lateral views; C, D. Head of female, dorsal and anterodorsal views; E. Face of female; F, G. Female genitalia, lateral and ventral views; H, I. Male pygofer, lateral and ventral views; J. Valve, subgenital plates and styli, ventral view; K–N. Aedeagus, lateral, caudal, anterior and ventral view; O. Forefemur and foretibia of male, anterior view; P. 1st, 2nd and 3rd valvulae of female genitalia, lateral view; Q. Apex of 1st valvulae; R. Apex of 2nd valvulae.

Specimens examined. 1♂1♀, **China**, Hainan, Ledong county, Jiangfengling, 09-IV-2013, coll. SUN & ZHANG (NWAFU).

Remarks. This species was described from China (Hainan) by Dai *et al*. (2016), but females were previously unknown. Here we describe and illustrate the pregenital abdominal

sternite and ovipositor (1st and 2nd valvulae) of *P. basispina*.

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References

Cai P & Shen XC. 1999. Nine new species of Cicadellidae from Baotianman (Homoptera: Cicadellidae). *In*: Shen XC & Shi ZY (Eds.), *Insect Fanua Study of Henan vol. 4. Insect of South slope of Funiu Mountain and Dabie Mountains.* China Agricultural Science and Technology Press, Beijing, pp. 24–35.

Dai RH, Qu L & Yang MF. 2016. A new leafhopper species of *Parabolopona* and a new record for *Favintiga camphorae* from china (Hemiptera: Auchenorrhyncha: Cicadellidae: Deltocephalinae: Drabescini). *Entomologica Americana*, 122(3): 393–397.

Ohara N & Kogure K. 2012. A new species of the genus *Parabolopona* (Hemiptera,Cicadellidae, Deltocephalinae, Drabescini) from the Central Ryukyus, Japan. *Japanese Journal of Systematic Entomology*, 18(2): 203–208.

Shang SQ, Zhang YL, Shen L & Li HH. 2006. Two new generic records and two new species of the leafhopper subfamily Selenocephalinae (Hemiptera: Cicadellidae) from China. *Entomotaxonomia*, 28(1): 33–39.

Matsumura S. 1912. Die Acocephalinen und Bythoscopinen Japans. *The journal of the Sapporo Agricultural College*, 4(7): 279–325.

Meshram NM, Shashank PR & Srinivasa N. 2016. New records of the genus *Parabolopona* Matsumara (Hemiptera: Cicadellidae: Deltocephalinae), with description of a new species from India. *Zootaxa*, 4114(2): 182–188.

Webb MD. 1981. The Asian, Australasian and Pacific Paraboloponinae (Homoptera: Cicadellidae). *Bulletin of the British Museum* (*Natural History*) (*Entomology*), 43(2): 39–76.

Xu DL & Zhang YL. 2020. Taxonomy of the Oriental leafhopper genus *Parabolopona* (Hemiptera: Cicadellidae: Deltocephalinae: Drabescini) with a new species from China. *Zootaxa*, 4821(1): 189–195.

Zahniser JN & Dietrich CH. 2013. A review of the tribes of Deltocephalinae (Hemiptera: Auchenorrhyncha: Cicadellidae). *European Journal of Taxonomy*, 45: 1–211.

Zhang YL, Chen B & Shen L. 1995. On Chinese species of the genus *Parabolopona* Matsumura (Homoptera: Cicadellidae). *Entomotaxonimia*, 17(supplement): 9–14.

Zhang YL & Webb MD. 1996. A revised classification of the Asian and Pacific Selenocephalinae leafhoppers (Homoptera: Cicadellidae). *Bulletin of the Natural History Museum, Entomology Series*, 65: 1–103.