A NEW GENUS OF THE TRIBE EPORINI (HEMIPTERA: FULGOROMORPHA: TROPIDUCHIDAE) WITH DESCRIPTION OF THREE NEW SPECIES FROM YUNNAN, CHINA

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ABSTRACT

A new tropiduchid genus of the tribe Eporini (Hemiptera: Fulgoromorpha: Tropiduchidae) is described from Yunnan Province, China: Paraepora Chang & Chen gen. nov. Three new species: P. bifurca Chang & Chen, sp. nov., P. cultellata Chang & Chen, sp. nov. and P. tegula Chang & Chen, sp. nov. are described and illustrated. A checklist and key to the genera in tribe Eporini, and a key to species of the genus Paraepora are given.

Key Words: Fulgoroidea, taxonomy, Oriental region, planthopper

RESUMEN

Se describe un nuevo género, Paraepora Chang y Chen gen. nov. de la familia Tropiduchidae y tribu Eporini (Hemiptera: Fulgoromorpha: Tropiduchidae) de la provincia de Yunnan, China. Se describen e ilustran tres especies nuevas: P. bifurca Chang y Chen, sp. nov., P. cultellata Chang y Chen, sp. nov. y P. tegula Chang y Chen, sp. nov. Se provee una lista de verificación, una clave para los géneros de la tribu Eporini y una clave de las especies del género Paraepora.

Palabras Clave: Fulgoroidea, taxonomía, región Oriental, chicharrita, salta plantas

MATERIALS AND METHODS

Morphological terminology follows Bourgoin & Huang (1990). Dry specimens were used for the descriptions and illustrations. External morphology was observed by a stereoscopic microscope and characters were measured with an ocular micrometer. Measurements are given in millimeters. The genital segments of the examined specimens were macerated in 10% KOH, then washed in water and transferred to glycerin. Illustrations of the specimens were made by a Leica MZ 12.5 stereomicroscope. Photographs were taken by a
Leica D-lux 3 digital camera. The digital images were then imported into Adobe Photoshop 8.0 for labeling and plate composition.

The type specimens and material examined are deposited in the Institute of Entomology, Guizhou University, Guiyang, China (GUGC).

CHECKLIST OF THE WORLD EPORINI

Clardeina Fennah, 1982
Aethomyctus Williams, 1981
A. viridis Williams, 1981 — Mauritius.
Clardea Signoret, 1862
C. notatula Stål, 1866 — Reunion.
C. unicolor Signoret, 1862 — Mauritius, Reunion.
Conchyoxytera Signoret, 1860
C. unicolor Signoret, 1860 — Mauritius, Reunion, Madagascar.
Cuneoceps Williams, 1981
Cyrtomycta Williams, 1981
Daradaxoides Distant, 1917
D. mahensis Distant, 1917 — Seychelles.
Idiomyctus Williams, 1981
I. nigrostriatus (Synave, 1961) — Mauritius.
I. notatulus (Stål, 1866) — Reunion.
Pseudoclardea Williams, 1981
P. leguati (Muir, 1925) — Mauritius (Rodriguez).

Stiborus Melichar, 1903
S. viridis Melichar, 1903 — Sri Lanka (Peradeniya)
Eporina Fennah, 1982
Epora Walker, 1857
E. bilemisca Qin & Men, 2010 — China (Hainan, Guangdong).
E. biprolata Men & Qin, 2011 — China (Hainan, Fujian).
E. hainanensis Chou & Wang, 1985 — China (Hainan).
E. montana Distant, 1912 — India (Nilgiri Hills, Bengal, Calcutta).
E. subtilis Walker, 1857 — Sri Lanka (Bogawantalawa).
E. themisto Fennah, 1970 — Philippine (Tawi Tawi).

Eporiella Melichar, 1914
E. ceylonica Melichar, 1914 — Sri Lanka.
Mesepora Matsumura, 1914
M. onuhii Matsumura, 1914 — China (Hainan, Taiwan), Japan.
Paraepora Chang & Chen gen. nov.
P. bifurca Chang & Chen sp. nov. — China (Yunnan).
P. cultellata Chang & Chen sp. nov. — China (Yunnan).
P. tegula Chang & Chen sp. nov. — China (Yunnan).

KEY TO GENERA OF EPORINI

1. Vertex with posterior margin broadly concave ........................................ 2
   —. Vertex with posterior margin angulately concave ................................ 6
2. Forewings without transverse veins in cross cell ................................... Eporiella
   —. Forewings with transverse veins in cross cell .................................... 3
3. Forewings with numerous short longitudinal veins, form reticular veins in apical margin ...
   ............................................................................ Mesepora
   —. Forewings without numerous short longitudinal veins, not form reticular veins ..... 4
4. Forewings less 2.0 times longer than of the maximum width ......................... Stiborus
   —. Forewings more 2.2 times longer than the maximum width ....................... 5
5. Pronotum with 2 median carinae ......................................................... Epora
   —. Pronotum with one median carina .................................................. Paraepora gen. nov.
6. Vertex obviously projecting before the eyes, more 2.0 times longer in middle than the breadth ........ 7
—. Vertex slightly projecting before the eyes, less 2.0 times longer in middle than wide ........... 9

7. Forewings widest at or before the middle, then narrowing gradually .................. Conchyoptera
—. Forewings widest beyond the middle or at apex ............................................. 8

8. Forewings with numerous irregular short veins in membrane ....................... Cyrtomycta
—. Forewings with two ranks of transverse veins in membrane, form apical cells and subapical cells ............................................................... Daradaxoides

9. Forewings with incomplete transverse veins in cross cell ............................... 10
—. Forewings with complete transverse veins in cross cell .............................. 12

10. Forewings with costal area wider than costal cell ...................................... Cuneoceps
—. Forewings with costal area narrower than costal cell .................................. 11

11. Forewings with apical cells small; vertex with complete median carina .......... Pseudoclardea
—. Forewings with apical cells big; vertex with incomplete median carina .......... Clardea

12. Hind tibiae with 7 apical spines; 6 spines on first metatarsal segment .......... Idiomyctus
—. Hind tibiae with 6 or 7 apical spine; 5 spines on first metatarsal segment ........ Aethomyctus

Taxonomy

Eporini Fennah, 1982
Eporina Fennah, 1982
Paraepora Chang & Chen, gen. nov.

Type Species

Paraepora bifurca Chang & Chen, sp. nov., here designated.

Description

Medium-sized tropiduchids. Body length (from apex of vertex to tip of forewings): male 6.8-7.6 mm, female 7.3-8.4 mm.

Coloration. General color light green or yellow green (Figs. 1, 4, 7). Forewings translucent. Compound eyes brown, ocelli yellow green (Figs. 2, 5, 8). Tips of spines on hind tibiae and tarsi black.

Head and Thorax. Head with eyes narrower than pronotum, produced in front of eyes and apically rounded. Vertex (Figs. 16, 26, 36) more 2.0 times broader than long in middle line; anterior margin archly convex, lateral margins ridged and subparallel, posterior margin concave; disc depressed, with two subtle median carinae, not reaching anterior margin. Frons (Figs. 18, 28, 38) longer than broad, widest at apical fourth, with a distinct median carina, disc depressed between median carina and lateral margins, lateral margins slightly ridged, frontoclypeal suture distinctly arched. Clypeus with median carina, without lateral carinae. Rostrum long, reaching between hind coxae. Compound eyes oval, ocelli small.

Antenna with scape short, ring-like; pedicel subglobose. Pronotum (Figs. 16, 26, 36) tricarinate, longer than vertex in middle line; anterior margin distinctly arched, posterior margin obtusely excavated, lateral carinae converging anteriorly; median carina distinctly ridged, not reaching anterior margin, with a short subcarinae between eyes and tegulae on each side. Mesonotum (Figs. 16, 26, 36) tricarinate, median carina straight, reaching to the mesoscutellum, lateral carinae curving anteriorly towards median carina. Forewings (Figs. 19, 29, 39) subhyaline, less than 2.5 times as long as the maximum width, widest at level of nodal line, anterior margin slightly arched, posterior margin straight, rounded apically; corium smooth, without granulation, costal cell broader, with sparse oblique transverse veinlets, Sc+R veins forked basad of middle of forewing, and Cu veins bifurcated in basal quarter, M veins simply reaching to nodal line, claval veins uniting in middle of clavus, nodal line and subapical line distinct, forming 7-9 subapical cells and 11-15 apical cells. Hind wing (Figs. 20, 30, 40) hyaline, simple. Hind tibia with 3 lateral spines, spinal formula of hind leg 7-7-2.

Male Genitalia. Pygofer (Figs. 21, 31, 41) bilaterally symmetrical, irregularly subquadrate in side profile, dorsal margin broad, ventral margin narrow, dorsal margin inclining to the ventrad. Anal tube (Figs. 21-22, 31-32, 41-42) symmetrical, relatively long, surpassing or not apex of aedeagus; anal styles relatively elongate, surpassing or not apex of anal tube in dorsal view. Gonostyli (Figs. 21-23, 31-33, 41-43) symmetrical, elongate; in lateral view, basal part narrower than breadth, the apical aspect
round, with a stout triangular process on upper margin at base or in middle, beyond this process with a hooked process, lateroventrally directed, dorsal margin with a hooked-triangular process near apex, pointing medially. Aedeagus (Figs. 24-25, 34-35, 44-45) elongate, tube-like, membranous, narrow at base, distinctly expanded at apex, with several different processes. Periandrium (Figs. 24-25, 34-35, 44-45) tube-like, well developed, surrounding aedeagus medially, with different process at apex. Corpus connective (Figs. 24-24, 34-35, 44-45) stout, with a subtriangular plate-shaped process.

Figs. 1-9. Dorsal and ventral habitus of *Paraepora* Chang & Chen gen. nov. species. (Figs. 1-3) *P. bifurca* Chang & Chen sp. nov.; (Figs. 4-6) *P. cultellata* Chang & Chen sp. nov.; (Figs. 7-9) *P. tegula* Chang & Chen sp. nov. Scale bars = 1.0 mm.
Etymology

The genus name, which is feminine, is a combination of “para-” (which means parallel, beside or near) and “Epora” (name of a similar genus), indicating that the new genus is similar to the genus Epora Walker.

Host Plant

Unknown.

Distribution

China (Yunnan).

Remarks

This new genus is similar to Epora Walker, 1857, in: i) vertex broader at base than long in midline, with subtle median carina or no carina (Figs. 2, 5, 8, 11); ii) forewings with complete oblique transverse veinlets in costal cell, with two ranks of transverse veins in membrane, forming
apical cells and subapical cells (Figs. 12, 15, 19, 29, 39); iii) gonostyli with a triangular process on upper margin, with a hooked process, lateroventrally directed (Figs. 13-14, 21-22, 31-32, 41-42). But this new genus can be distinguished from the latter by: i) pronotum with one median carina, not reaching anterior margin (pronotum with two median carinae in *Epora*) (Figs. 2, 5, 8, 11); ii) forewings less than 2.5 times as long as their maximum width, costal cell broad, with 6-8 oblique transverse veinlets (forewings more 2.5 times longer than the maximum width, costal cell narrower, with 13-16 oblique transverse veinlets in *Epora*) (Figs. 12, 15, 19, 29, 39); iii) gonostyli long, dorsal margin with a hooked-triangular process near apex (gonostyli short, usually not reaching to the tip of anal tube in *Epora*) (Figs. 13-14, 21-22, 31-32, 41-42).

**Paraepora bifurca** Chang & Chen, *sp. nov.* (Figs. 1-3, 16-25)

**Description**

Measurements. Body length (from apex of vertex to tip of forewings): male 6.8-6.9 mm (*N* = 6), female 7.7-7.8 mm (*N* = 5).


Head and Thorax. Vertex (Fig. 16) broader than long in middle line (2.5:1.0). Frons (Fig. 18) longer in middle than maximum width (1.5:1.0), widest at apical fourth. Pronotum (Fig. 16) obviously wider than long in middle (5.4:1.0). Mesonotum (Fig. 16) wider than long in middle (1.4:1.0). Forewings (Fig. 19) anterior margin arched, posterior margin straight, costal cell with 5-7 short transverse veinlets, Sc+R forking about at basal 2/5, Cu 1 forking about at basal 1/4, with about 11 apical cells and 8 subapical cells, claval veins uniting middle of clavus. Hindwing with venation as in Fig. 20. Hind tibia with 3 lateral spines, spine formula of hind leg 7-7-2.

Male Genitalia. Pygofer (Fig. 21) narrow and high in lateral view, anterior margin concave on dorsal 1/3, posterior margin concave on ventral 1/4, lateral margins parallel. Anal tube (Figs. 21-22) relatively short, not reaching the apex of aedeagus; anal styles relatively elongate, just reaching to apex of anal tube in dorsal view. Gonostyli (Figs. 21-23) symmetrical, elongate, in lateral view, relatively long, basal part narrower than apical part, the apical margin round, with a stout triangular process on upper margin at basal 1/3, beyond this process with a hooked process, lateroventrally directed, dorsal margin with a hooked-triangular process near in middle, pointing inward. Aedeagus (Figs. 21, 24-25) elongate, tube-like, distinctly expanded and membranous, with a cystic component at apex on left side, with a bifurcate process near apex in right view. Periandrium (Figs. 24-25) tube-like, developed, surrounding aedeagus medially, with an acinaciform process at apex on left side, with a foliate plate in right side. Corpus connective stout, with a subtriangular plate-shape process.

**Type Material**

**HOLOTYPE:** δ, CHINA: Bingzhongluo (N 28°00′ E 98°37′), Gongshan County, Yunnan Province, 30-VII-2012, J.-K. Long; (GUGC). **PARA-TYPES:** 4 δ, 4 ♀♀, same data as holotype; (GUGC). 1 δ, Fugong County (N 27°00′ E 98°51′), Yunnan Province, 25-VII-2012, Y.-G. Xiao; (GUGC). 2 δ, 5 ♀♀, Pengdang (N 27°57′ E 98°40′), Gongshan County, Yunnan Province, 29-VII-2012, J.-K. Long and Y.-G. Xiao (GUGC).

**Etymology**

The name is derived from the Latin word “bifurca” referring to the bifurcate process near the apex of aedeagus.

**Host Plant**

Unknown.

**Distribution**

China (Yunnan).

**Remarks**

This new species is distinguished from other species of this genus *Paraepora* gen. nov. by: i) aedeagus with a cystic component at apex in left side, with a bifurcate process near apex in right view; ii) periandrium with an acinaciform process at apex in left side, and with a foliate plate in right side.

**Paraepora cultellata** Chang & Chen, *sp. nov.* (Figs. 4-6, 26-35)

**Description**

Measurements. Body length (from apex of vertex to tip of forewings): male 7.4-7.5 mm (*N* = 5), female 8.2-8.4 mm (*N* = 4).

Coloration. General color green or yellow green. Compound eyes brown, ocelli yellow green. Tips of spines on hind tibiae and tarsi black.

Head and Thorax. Vertex (Fig. 26) broader than long in middle line (2.7:1.0). Frons (Fig. 28) longer in middle than maximum width (1.4:1.0), widest at apical fifth. Pronotum (Fig. 26) obviously wider than long in middle (5.4:1.0). Mesonotum (Fig. 26) wider than long in middle (1.4:1.0). Forewings (Fig. 29) anterior margin arched, posterior margin concave at apex, costal cell with 6-8 oblique transverse veinlets, Sc+R forking about at basal 2/5, Cu 1 forking about at basal 1/4, with about 11 apical cells and 8 subapical cells, claval veins uniting middle of clavus. Hindwing with venation as in Fig. 20. Hind tibia with 3 lateral spines, spine formula of hind leg 7-7-2.

Male Genitalia. Pygofer (Fig. 21) narrow and high in lateral view, anterior margin concave on dorsal 1/3, posterior margin concave on ventral 1/4, lateral margins parallel. Anal tube (Figs. 21-22) relatively short, not reaching the apex of aedeagus; anal styles relatively elongate, just reaching to apex of anal tube in dorsal view. Gonostyli (Figs. 21-23) symmetrical, elongate, in lateral view, relatively long, basal part narrower than apical part, the apical margin round, with a stout triangular process on upper margin at basal 1/3, beyond this process with a hooked process, lateroventrally directed, dorsal margin with a hooked-triangular process near in middle, pointing inward. Aedeagus (Figs. 21, 24-25) elongate, tube-like, distinctly expanded and membranous, with a cystic component at apex on left side, with a bifurcate process near apex in right view. Periandrium (Figs. 24-25) tube-like, developed, surrounding aedeagus medially, with an acinaciform process at apex on left side, with a foliate plate in right side. Corpus connective stout, with a subtriangular plate-shape process.
Figs. 16-25. *Paraepora bifurca* Chang & Chen sp. nov. (16) Head and thorax, dorsal view; (17) Same, lateral view; (18) Head, ventral view; (19) Forewing; (20) Hind wing; (21) Male genitalia, lateral view; (22) Same, dorsal view; (23) Same, ventral view; (24) Aedeagus and anal segment, left side; (25) Same, right side. Scale bars = 1.0 mm (Figs. 16-20), 0.5 mm (Figs. 21-25). Abbreviations: ap, acinaciform process; bp, bifurcate process; cc, cystic component; fpl, foliate plate.
margin straight, costal cell with 7-8 short transverse veinlets, Sc+R forking about at basal 2/5, Cu forked near basal 1/4, with about 11 apical cells and 7-8 subapical cells, claval veins uniting middle of clavus. Hind wing with venation as in Fig. 30. Hind tibia with 3 lateral spines, spine formula of hind leg 7-7-2.

Male Genitalia. Pygofer (Fig. 31) narrow and high in lateral view, anterior margin concave on dorsal 1/2, posterior margin concave on ventral 2/3, dorsal margin 2.4 times broader than ventral margin. Anal tube (Figs. 31-32) relatively short, not reaching the apex of aedeagus; anal styles relatively elongate, just surpassing to apex of anal tube in dorsal view. Gonostyli (Figs. 31-33) symmetrical, elongate, in lateral view, relatively long, basal part narrower than apical part, the apical margin narrow, with a stout triangular process on dorsal margin of apical 1/3, pointing inward. Aedeagus (Figs. 34-35) elongate, tube-like, distinctly expanded and membranous, with a cystic component at apex in left side, with a cultrated process near apex on right side. Periandrium (Figs. 34-35) tubular, developed, surrounding aedeagus medially, with a foliate process in right side. Corpus connective stout, with a subtriangular plate-shape process.

Type Material


Etymology

This new species is named for the presence of a cultrated process near apex of aedeagus in right side.

Host Plant

Unknown.

Distribution

China (Yunnan).

Remarks

This new species is similar to Paraepora tegula Chang & Chen, sp. nov., but can be distinguished from the latter by: i) vertex broader than long in middle line (2.7:1.0); ii) aedeagus with a cultrated process near apex in right side; iii) periandrium with a falcate process at apex in left side, with a hooked process in right side.

Paraepora tegula Chang & Chen, sp. nov.

(Figs. 7-9, 36-45)

Description

Measurement. Body length (from apex of vertex to tip of forewing): male 7.4-7.6 mm (N = 7), female 7.3-8.0 mm (N = 4).


Head and Thorax. Vertex (Fig. 36) broader than long in middle line (2.5:1.0). Frons (Fig. 38) longer in middle than maximum width (1.4:1.0), widest at apical fifth. Pronotum (Fig. 36) obviously wider than long in middle (5.1:1.0). Mesonotum (Fig. 36) wider than long in middle (1.5:1.0). Forewing (Fig. 39) about 2.4 times longer than the widest part, anterior margin arched, posterior straight, costal cell with 7-8 short transverse veinlets, Sc+R forking near basal 2/3, Cu forked near basal 1/3, with about 15 apical cells and 9 subapical cells, claval veins unite at middle of clavus. Hind wing with venation as in Fig. 40. Hind tibia with 3 lateral spines, spine formula of hind leg 7-7-2.

Male Genitalia. Pygofer (Fig. 41) irregularly subquadrate in lateral view, anterior margin moderately concave, posterior margin concave on ventral 1/3, dorsal margin broad, ventral margin narrow. Anal tube (Figs. 41-42) elongate, reaches to apex of aedeagus, dorsal margin and ventral margin parallel, ventral margin bent ventrad in apical 1/5, with a sharp point in lateral view; lateral margins parallel in dorsal view; anal styles relatively long, slightly surpass apex of anal tube in dorsal view. Gonostyli (Figs. 41-43) elongate, expanded at basal 1/3 then narrowing toward the apex in lateral view, with median triangular process in apical 2/5 and a hook-like process produced in dorsolateral side, pointing outward, with a distinct triangular process in apical 1/5, directed inward. Aedeagus (Figs. 44-45) tubular, apex of aedeagus expanded membranous, with tegular process in dorsal margin, with a quadrangular process in left view, with one foliate process in right view. Periandrium (Figs. 44-45) asymmetrical, well developed, tubular, surrounding aedeagus in basal 3/4, with an irregular sheet-like process in right view.

Type Material

HOLOTYPE: ♂, CHINA: Baoshan city (N 25° 12' E 99° 08", 1,946 m), Yunnan Province, China, 21-VIII-2006, Q.-Z. Song and Y. Tang; (GUGC).
Figs. 26-35. *Paraepora cultellata* Chang & Chen sp. nov. (26) Head and thorax, dorsal view; (27) Same, lateral view; (28) Head, ventral view; (29) Forewing; (30) Hind wing; (31) Male genitalia, lateral view; (32) Same, dorsal view; (33) Same, ventral view; (34) Aedeagus and anal segment, left side; (35) Same, right side. Scale bars = 1.0 mm (Figs. 26-30), 0.5 mm (Figs. 31-35). Abbreviations: cc, cystic component; cp, cultrated process; fcp, falcate process; hp, hooked process.
Paraepora tegula Chang & Chen sp. nov. (36) Head and thorax, dorsal view; (37) Same, lateral view; (38) Head, ventral view; (39) Forewing; (40) Hind wing; (41) Male genitalia, lateral view; (42) Same, dorsal view; (43) Same, ventral view; (44) Aedeagus and anal segment, left side; (45) Same, right side. Scale bars = 1.0 mm (Figs. 36-40), 0.5 mm (Figs. 41-45). Abbreviations: fp, foliate process; qp, quadrangular process; sp, sheet process; tp, tegular process.
PARATYPES: 8 ♂, 4 ♀, same data as holotype (GUGC).

Host Plant
Unknown.

Distribution
China (Yunnan).

Etymology
The specific name refers to the Latin word “tegula”, meaning the aedeagus with tegular process in dorsal margin.

Remarks
This new species is similar to P. bifurca Chang & Chen, sp. nov. and P. cultellata Chang & Chen, sp. nov., but can be distinguished from those 2 species by the following traits: i) forewings with 9 subapical cells and 15 apical cells; ii) apex with tegular process in dorsal margin, with a quadrangular process in left view, with one foliate process in right view; iii) periandrium with an irregular sheet-like process in right view.

KEY TO THE SPECIES OF THE GENUS PARAEPORA GEN. NOV.

1. Apex of periandrium without any process in left side, with an irregular sheet-like process in right side (Figs. 44-45) ........................................... P. tegula sp. nov.

—. Apex of periandrium with 2 diverse processes ........................................ 2

2. Aedeagus with a bifurcate process near apex in right side; periandrium with an acinaciform process at apex in left side, with a foliate plate in right side (Figs. 24-25) .... P. bifurca sp. nov.

—. Aedeagus with a cultrated process near apex in right side, periandrium with a falcate process at apex in left side, with a hooked process in right side (Figs. 34-35) ......... P. cultellata sp. nov.

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