Dictyotenguna choui, a new genus and species of Dictyopharinae (Hemiptera: Fulgoromorpha: Dictyopharidae) from China

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Abstract: A new Oriental dictyopharid genus and species, *Dictyotenguna choui* gen. n., sp. n., is described and illustrated from China. A brief review of the family Dictyopharidae from the Oriental and eastern Palaearctic Regions is provided.

Key words: Hemiptera; Dictyopharidae; new genus; new species; China
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中国象蜡蝉科一新属新种（半翅目：蜡蝉总科）

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摘要：记述中国象蜡蝉科（半翅目：蜡蝉总科）1 新属：滕象蜡蝉属 *Dictyotenguna* gen. n.，其模式种为周氏滕象蜡蝉 *Dictyotenguna choui* sp. nov.。简要介绍了东洋界和东古北界象蜡蝉系统学发展概况。模式标本保存于中国科学院动物研究所国家动物博物馆。

关键词：半翅目；象蜡蝉科；新属；新种；中国

Introduction

The planthopper family Dictyopharidae is one of the larger families of 28 Fulgoroidea families currently recognized, including nearly 730 described species in 163 genera (Bourgoin 2012). These species are widely distributed in most parts of the world, especially in the tropical regions such as South America, the Oriental Region and the East Indies (Metcalf 1946).

Traditionally, it is recognized by most dictyopharid workers that the family is separated into two subfamilies Dictyopharinae and Orgeriinae. The subfamily Orgeriinae, a distinct lineage within Dictyopharidae, is composed of four tribes (Colobocini, Almanini, Orgeriini and Ranissini) and is restricted in the arid regions of the Holarctic Region (Emeljanov *et al.* 2005). The phylogenetic relationships and evolution of Orgeriinae tribes was proposed by

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Emeljanov (1980) and Emeljanov *et al.* (2005). The subfamily Dictyopharinae, distributed worldwide, comprises eleven extant tribes (Aluntiini, Capenini, Cleotychini, Dictyopharini, Hastini, Lappidini, Nersiini, Phylloscelini, Orthopagini, Scoloptini and Taosini) and two fossil tribes (Netutelini and Worskaitini) (Emeljanov 1979, 1983, 1997, 2008, 2011a, b; Szwedo 2008). Emeljanov's revisions of Dictyopharidae compose a hypothesis for phylogenetic analysis, but they are untested by a cladistics analysis.

The Dictyopharidae fauna of the Oriental and eastern Palaearctic Regions remains inadequately studied. A total of 104 species in 35 genera have been recorded from the Oriental and eastern Palaearctic Regions before 2004 (Song 2007). The overwhelming majority of species and genera are restricted to the Oriental Region. The main workers who focused on the taxonomy of Dictyopharidae include Walker, Stål, Melichar, Distant, Bierman, Kirkaldy, Matsumura, Fennah and Emeljanov. Their studies laid the preliminary framework for investigating the phylogenetic relationships of Oriental and eastern Palaearctic Dictyopharidae.

Since 2005, a series of papers about Dictyopharidae from the Oriental and eastern Palaearctic Regions have been published or are in press by the authors and their collaborators (Liang & Jiang 2005; Song & Liang 2006a, b, 2007, 2008a, b, 2011a, b; Liang & Song 2006, 2012; Liang *et al*. 2006; Song *et al*. 2011; Song *et al*. 2012 in press). Among these works, 16 genera including more than 70 species were revised, three synonymized genera were resurrected to valid status, and two new genera and 27 new species were established.

Up to now, a systematic revision and phylogenetic analysis of the world Dictyopharidae is far from enough. Our research creates an opportunity to develop some analyses of the phylogeny and biogeography of the Oriental and eastern Palaearctic Dictyopharidae. These study results would provide a reference frame to review and investigate the phylogenetic relationships and evolution of world Dictyopharidae in future.

While sorting and identifying Chinese Dictyopharidae from material in the Institute of Zoology, Chinese Academy of Sciences, Beijing, we found a new genus and species, *Dictyotenguna choui* gen. n., sp. n., similar to *Tenguna* Matsumura, 1910.

Material and methods

The genitalia were cleared in 10% KOH at room temperature for ca. 12 hours, rinsed in distilled H_2O, then transferred to glycerol for examination. Morphological characters were observed with a Zeiss (Stemi SV II) optical stereomicroscope and illustrated with the aid of a drawing tube; measurements were made with the aid of an eyepiece micrometer. The specimens studied in the course of this work are deposited in the Zoological Museum, Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS).

The morphological terminology used in this study follows Emeljanov (1988) for external morphology and venation of the forewings, Bourgoin & Huang (1990) for male genitalia and Bourgoin (1993) for female genitalia.

Description

Genus *Dictyotenguna* gen. n.

Type species. *Dictyotenguna choui* sp. n., by present designation.

Diagnosis. General color yellowish green, frons between lateral intermediate carinae purplish-red; head moderately elongate, more or less truncate apically; vertex with lateral carinae sub-parallel at base, gradually narrowing in front of eyes anteriorly, more or less truncate apically; frons with median carina robust and strongly elevated, intermediate carinae slightly converging posteriorly and approaching posterior margin of eyes; pronotum with median carina distinct, without intermediate carinae; mesonotum tricarinate on disc, lateral carinae curving anteriorly towards median carina and forked obscurely towards front; forewings with stigma long with 3–4 cells; legs moderately elongate, fore femora not flattened and dilated, with a short small spine near apex; hind tibiae with 8 apical spines; segment X (anal tube) in males distinctly large and broad, apical lateral margins strongly protruded posteriorly; aedeagus with a pair of endosomal processes extended dorsally from phallobasal cavity; phallobase basally sclerotized and pigmented, with apical membranous lobes.

General color yellowish green; carinae on cephalic process, frons, pronotum and mesonotum, and parts of veins on fore wings, dark green; frons between lateral intermediate carinae purplish-red; rostrum with extreme apex blackish; hind tibia with a black marking at extreme apex.

Head (Figs. 1–4) relatively short, produced into a moderate cephalic process shorter than pronotum and mesonotum combined. Vertex (Figs. 1–4) with lateral carinae sub-parallel at base, gradually narrowing in front of eyes anteriorly, more or less truncate apically; posterior margin angularly concave; median carina complete, the basal part between eyes distinctly keeled, the remainder relatively obscure. Frons (Fig. 6) with lateral carinae nearly parallel-sided, posterior margin somewhat concave; median carina robust and strongly elevated, intermediate carinae slightly converging posteriorly and approaching posterior margin of eyes. Postclypeus and anteclypeus (Fig. 6) convex medially, with distinct median carina. Rostrum long, reaching beyond abdominal segment VI.

Pronotum (Figs. 1–5) distinctly shorter than mesonotum medially, narrow anteriorly, broad posteriorly; disc broad with median carina distinct, with a big lateral pit on each side, anterior margin centrally angularly produced, posterior margin angularly concave at about 120°; lateral marginal areas straight and sloping with two lateral longitudinal carinae on each side between eyes and tegulae. Mesonotum (Figs. 1–4) tricarinate on disc, lateral carinae curving anteriorly towards median carina and forked obscurely towards front. Forewings with Sc+R, M and CuA all branched apically; stigma distinct, with 3–4 cells. Legs moderately elongate, fore femora not flattened and dilated, with a distinct spine near apex; hind tibiae with 5–6 lateral black-tipped spines and 8 apical black-tipped spines; hind tarsomeres I with 13–15 and tarsomeres II with 11–13 black-tipped apical spines, respectively.

Male genitalia. Pygofer distinctly wider ventrally than dorsally, dorsal margin slightly excavated to accommodate anal tube. Segment X (anal tube) distinctly large and broad, apical lateral margins strongly protruded posteriorly into a large process, rounded apically; apical dorsal margin slightly excavated in dorsal view (Fig. 7) to accommodate anal style; anal style large and elongate, extraordinarily surpassing apical ventral margin of anal tube in dorsal view

(Fig. 7). Gonostyles symmetrical, relatively small, distinctly broadening towards apex in lateral view (Fig. 8), posterior margin more or less convex, upper margin with a dorsally directed, black-tipped process near middle, outer upper edge with a ventrally directed, hook-like process near middle. Aedeagus with a pair of endosomal processes extended dorsally from phallobasal cavity. Phallobase basally sclerotized and pigmented, with paired membranous inflated apical lobes, without spines (Figs. 10–12).

Female genitalia. Segment X round and large in dorsal view (Fig. 13). Gonopophyses VIII (first valvulae) with anterior connective lamina (ACL) large and sclerotized, with six teeth of varying sizes and shapes in lateral view (Fig. 14). Gonopophyses IX (second valvulae) with posterior connective lamina (PCL) triangular, symmetrical in ventral view (Fig. 15), fused with the intergonocoxal plate (iGxp) at base; iGxp extended cephalad into the genital cavity forming the wall of the gonospiculum. Gonoplacs (third valvulae) with two lobes: Gp1 and Gp2 homologous and fused basally; the lateral lobe (Gp1) large and moderately sclerotized, with 3–4 long setae at apex; the posterior lobe (Gp2) membranous, in which a long sclerotized plate is visible (Fig. 16).

Figures 1–3. Dorsal habitus of *Dictyotenguna* gen. n. 1. *Dictyotenguna choui* sp. n., male, holotype; 2. *Dictyotenguna choui* sp. n., female, paratype; 3. *Dictyotenguna* indet. sp., female.

Etymology. The new genus name is a combination of the prefix "dictyo" plus "*Tenguna*", which means it is similar to *Tenguna* Matsumura, 1910. The gender is feminine.

Remarks. *Dictyotenguna* gen. n. is very similar to *Tenguna* Matsumura, but can be distinguished from the latter by the frons between lateral intermediate carinae purplish-red; the vertex with lateral carinae more or less truncate apically; the frons with median carina robust and strongly elevated, intermediate carinae slightly converging posteriorly and approaching posterior margin of eyes; the mesonotum with lateral carinae forked obscurely at apex; and the segment X (anal tube) in males with apical lateral margins strongly protruded posteriorly.

The new genus is also similar to *Truncatomeria* Song & Liang, 2011, but can be separated from the latter by the general color which is almost uniformly yellowish green; the frons with intermediate carinae slightly converging posteriorly and approaching posterior

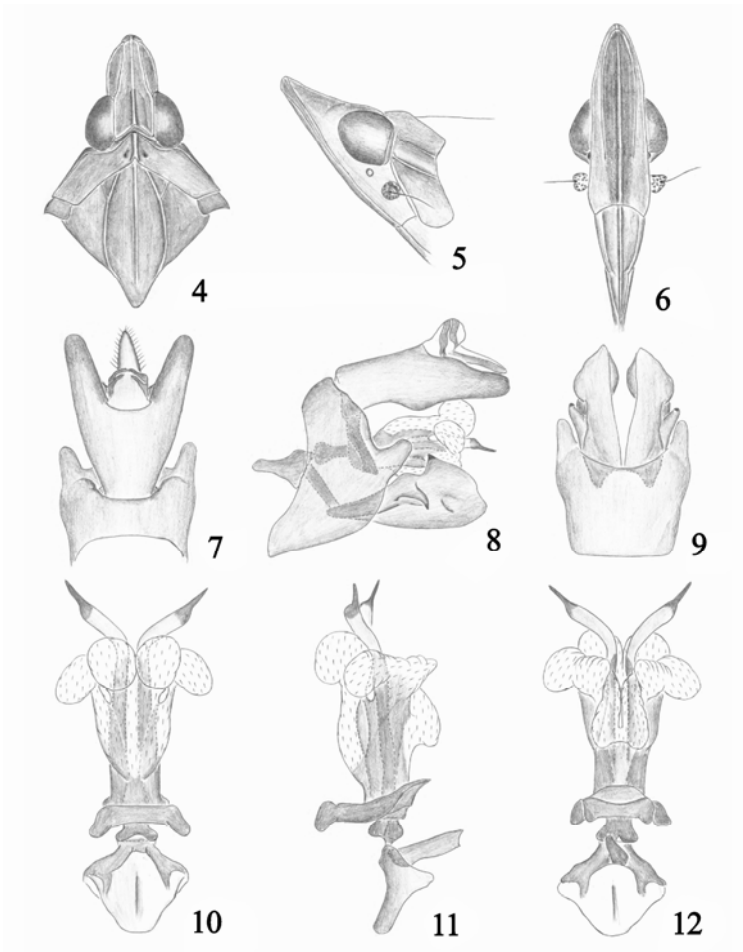
margin of eyes; the mesonotum with lateral carinae forked obscurely at apex; and the segment X (anal tube) in males with apical lateral margins strongly protruded posteriorly.

Distribution. Southern China.

1. ***Dictyotenguna choui* sp. n.** (Figs. 1, 2, 4–16)

Description. Male, length (from apex of cephalic process to tip of forewings) 15.4 mm; length of head 1.9 mm; width (including eyes) 1.5 mm; length of forewings 11.7 mm. Female, length (from apex of cephalic process to tip of forewings) 16.9 mm; length of head 2.0 mm; width (including eyes) 1.7 mm; length of forewings 13.3 mm.

Vertex (Figs. 1, 2, 4) with ratio of length to width between eyes about 2.4 : 1.0. Pronotum with lower lateral carinae behind eyes visible in dorsal view (Fig. 4). Hind tibia with 5–6 lateral black-tipped spines; hind tarsomeres I with 13–14 and tarsomeres II with 12–13 black-tipped apical spines, respectively.



Figures 4–12. *Dictyotenguna choui* sp. n. 4. Head, pronotum and mesonotum, dorsal view; 5. Head and pronotum, lateral view; 6. Head, ventral view; 7. Pygofer and anal tube, dorsal view; 8. Pygofer, gonostyles and anal tube of male, lateral view; 9. Pygofer and gonostyles of male, ventral view; 10. Aedeagus, dorsal view; 11. Aedeagus, lateral view; 12. Aedeagus, ventral view.

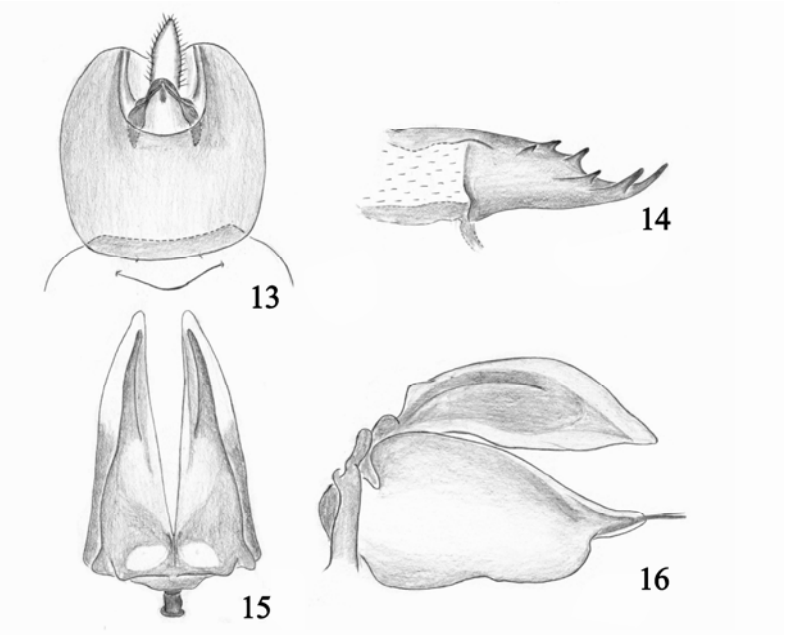
Male genitalia. Pygofer irregularly shaped, ventrally distinctly wider than dorsally (about 2.5: 1.0), posterior margin with a large process near middle, directed posteriorly, rounded apically in lateral view (Fig. 8); dorsal margin deeply excavated to accommodate anal tube, dorsal-lateral margins produced posteriorly in dorsal view (Fig. 7). Aedeagus (Figs. 10–12) distinctly robust and large, endosomal processes abruptly constricted at sub-apex, sclerotized and pigmented, directed posterolaterally. Phallobase with bases of dorsal and ventral parts and most portion of lateral parts sclerotized and pigmented, the remainder membranous; dorsal part with a pair of large rounded apical lobes in dorsal view (Fig. 10); ventrolateral apical parts produced in two fused lobes in lateral view (Fig. 11): one oval, directed laterally, the other cone-shaped, directed ventrally; ventral part with a pair of elongate lobes near middle in ventral view (Fig. 12).

Female genitalia as in generic description.

Etymology. The new specific epithet is a patronym of Io CHOU, one of the most outstanding entomologists in China.

Holotype. ♂, **China:** Fujian, Congan, Xingcun, Xianfengling, 850–1170 m, 16-VIII-1960, Zuo YONG. **Paratype.** 1♀, **China:** Guangxi, Guilin, Linyanshan, 786 m, light trap, 16-VII-1976, Baolin ZHANG.

Distribution. Southern China (Fujian, Guangxi).



Figures 13–16. *Dictyotenguna choui* sp. n. 13. Anal tube of female, dorsal view; 14. Gonopophysis VIII, lateral view; 15. Gonopophysis IX, ventral view; 16. Gonoplacs, ventrolateral view.

2. ***Dictyotenguna*** **indet. sp.** (Fig. 3)

Description. Female, length (from apex of cephalic process to tip of forewings) 13.3 mm; length of head 1.9 mm; width (including eyes) 1.3 mm; length of forewings 10.3 mm.

Vertex (Fig. 3) with ratio of length to width between eyes about 2.7: 1.0. Pronotum with lower lateral carinae behind eyes visible in dorsal view (Fig. 3). Hind tibia with 6 lateral

black-tipped spines; hind tarsomeres I with 15–16 and tarsomeres II with 13–14 black-tipped apical spines, respectively.

Specimens examined: 1♀, **China:** Yunnan, Cheli, Mengjie, 620 m, 22-IV-1957, Shuyong WANG.

Remarks. The specimen can be distinguished from *D. choui* sp. n. by the smaller body; and the relatively longer cephalic process, vertex with ratio of length to width between eyes about 2.7: 1.0.

Distribution. Southern China (Yunnan).

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