

Two New Genera of Delphacidae (Hemiptera: Fulgoroidea) from China

LIANG-ZHEN GUO¹, AI-PING LIANG^{1,*}, & JIN-HUA DING²

¹Institute of Zoology, Chinese Academy of Sciences, 19 Zhongguancun Road, Beijing 100080, P. R. China, and Graduate School, Chinese Academy of Sciences, Beijing 100049, P. R. China

²Plant Protection College, Nanjing Agricultural University, Nanjing 210095, P. R. China

*Corresponding author: e-mail: liangap@ioz.ac.cn

Abstract. Two new genera, *Rectivertex* Guo et Liang, gen. nov. (Type species: *Rectivertex saccatus* Guo et Liang, sp. nov.), *Micistylus* Guo et Liang, gen. nov. (Type species: *Micistylus triprocerus* Guo et Liang, sp. nov.) (Hemiptera: Delphacidae) are described and illustrated.

Key Words. Delphacidae, new genus, new species, China.

INTRODUCTION

The delphacid fauna of China remains inadequately studied. The only comprehensive treatment of Chinese Delphacidae was that of Kuoh *et al.* (1983) in their Delphacidae volume of the Economic Insect Fauna of China, which deals with 123 species distributed in 47 genera, 2 tribes and 2 subfamilies. The number of described species likely represents a small fraction of the actual diversity of Chinese delphacid fauna, considering the vast territory and various habitats of China (Liang 2002, Liang & Jiang 2003). Several distinct delphacid genera, e.g. *Asiraca* Latreille, *Vizcaya* Muir, *Neovizcaya* Liang, *Punana* Muir, and *Arcofaciella* Fennah, were reported and recorded from the Chinese fauna in recent years (Liang 1996, 1998, 2002; Liang & Jiang 2003, in press). More genera and species are expected as intensive collecting in China is carried out.

In this paper we add two additional new delphacid genera and species assigned to the tribe Delphacini from China with the descriptions, illustrations and diagnoses provided for their recognition and separation from the allied taxa.

METHODS AND MATERIALS

The specimens examined in this study are from the collection of the Institute of Zoology, Chinese Academy of Sciences (IZAS), Beijing, China. The terminology follows Yang & Yang (1986) and Kuoh *et al.* (1983). Morphological characters were observed under a Leica MZ 12.5 stereoscopic microscope. Illustrations were made with the aid of a drawing tube mounted on the microscope. Measurements were made with the aid of a micrometer scale in the ocular of the microscope.

TAXONOMY

Genus *Rectivertex* Guo et Liang, gen. nov.

Type species: *Rectivertex saccatus* Guo et Liang, sp. nov., by present designation.

Diagnosis. Vertex almost transversely rectangular, with sub-median carinae arising from lateral margin of vertex at basal third, not uniting at apex, Y-shaped carina distinct. Frons broad, widest at middle, median carina forked above lower level of

eyes. Antennae not surpassing clypeal suture. Pronotum with lateral carinae not reaching hind margin. Aedeagus tubular, simple. Diaphragm with dorsal margin deeply concave medially, posterior margin prominent medially. Parameres simple. Anal segment sunk in dorsal emargination of pygofer; lateroapical angles not produced into processes.

Description. Head including eyes slightly narrower than pronotum, in profile connecting with frons at rounded right angle. Vertex with sub-median carinae arising from lateral margin of vertex at basal third, not uniting at apex, vertex submedially shorter than width of vertex at base, stem of Y-shaped carina distinct. Frons broad, at midline longer than width at widest part, widest at middle, median carina forked at middle of frons. Rostrum surpassing mesotrochanters. Antennae cylindrical, not surpassing frontoclypeal suture, with basal segment about as long as width at apex, shorter than second segment. Pronotum with lateral carinae not reaching hind margin. Tegmen without pterostigma. Spinal formula of hind leg 5-7-4.

Male genitalia. Pygofer in posterior view with laterodorsal angle not produced, ventral margin arched, medioventral process absent. Aedeagus tubular, simple. Diaphragm with dorsal margin deeply concave medially, posterior margin prominent medially. Suspensorium long ring. Parameres simple. Anal segment sunk in dorsal emargination of pygofer; lateroapical angles not produced into processes.

Etymology. The generic name is derived from the Latin: *rectus* and *vertex*, referring to the genus having rectangular vertex.

Distribution. China: Hebei, Xinjing, Sichuan.

Remarks. This genus is similar to *Cemopsis* Fennah, but can be separated from the latter by the vertex transversely rectangular, frons widest at middle and median carina forked above lower level of eyes, antennae not surpassing frontoclypeal suture, medioventral process absent, lateroapical angles of anal segment not produced. In *Cemopsis*, frons widest at level of ocelli, and median carina forked at level of ocelli, antennae surpassing frontoclypeal suture, medioventral process present, and lateroapical angles of anal segment produced.

***Rectivertex saccatus* Guo et Liang, sp. nov.**

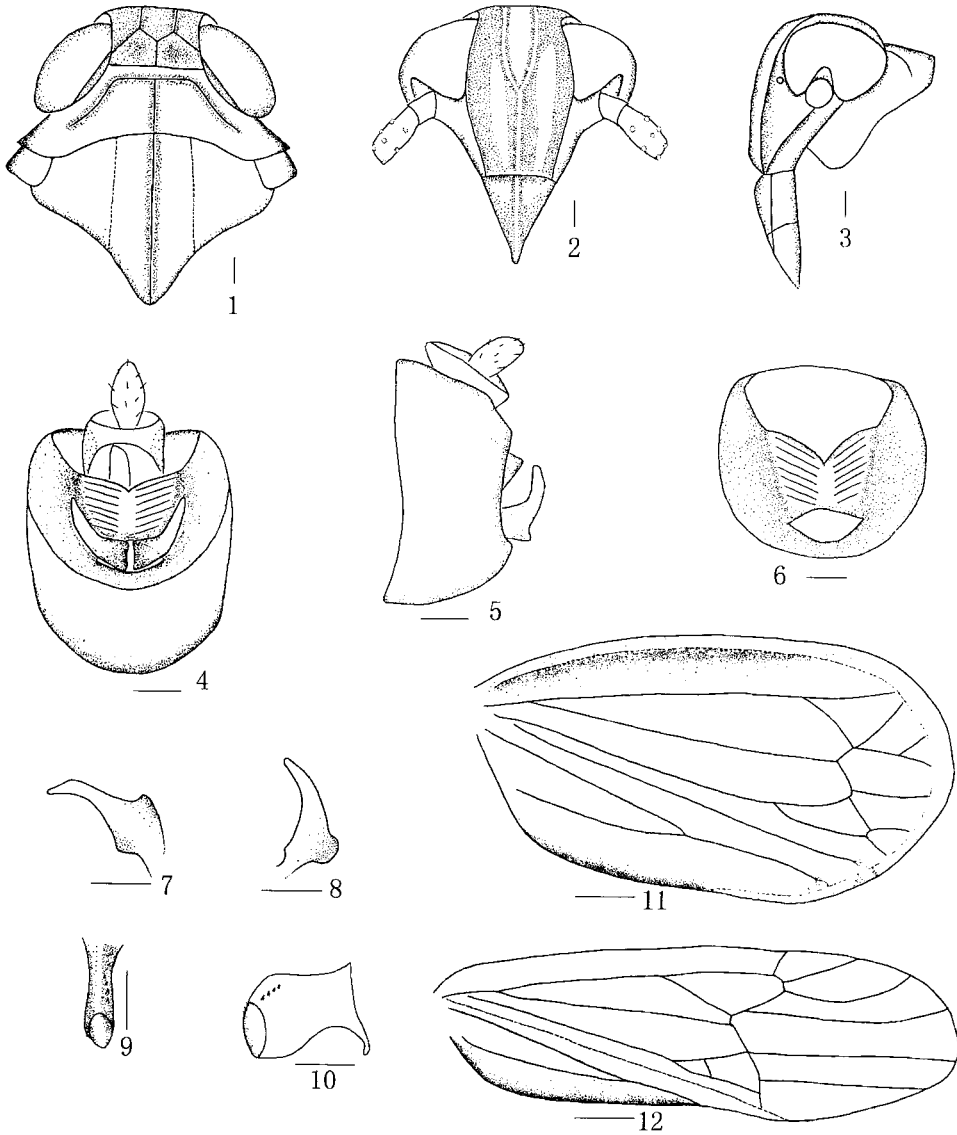
(Figs. 1-12)

Description. Brachypter. Body length: ♂ 2.4 mm, ♀ 2.8 mm.

Macropter. Body length: ♂ 2.6 mm, ♀ 3.0 mm; length (including teg.): ♂ 4.0 mm, ♀ 4.0 mm; tegmen: ♂ 3.4 mm, ♀ 3.2 mm.

Color ♂. Vertex black brown, basal compartment (including carinae), antennae, legs and thorax yellow brown. Frons, genae, clypeus and abdomen black brown. Frons with orange stripes along median carina. Tegmen light yellow brown, transparent.

Structure. Vertex wider than median length, almost transversely rectangular. Vertex submedially shorter than width at base (1:2.2), at midline shorter than width at base (1:1.4), basal compartment at base wider than its greatest length about 2.2:1, and wider than stem of Y-shaped carina (2.6:1). Frons at midline longer than width at widest part (♂ 1.5:1, ♀ 1.4:1). Postclypeus in profile not prominent, slightly wider at base than frons at apex, at midline shorter than frons (about ♂ 1:2.9, ♀ 1:2.6). Antennae cylindrical, not surpassing frontoclypeal suture; first segment as long as or longer than width at apex (♂ 1:1, ♀ 1.3:1), second segment longer than first (♂ 2:1, ♀ 1.8:1). Pronotum about as long as vertex, at midline slightly shorter than width



Figures 1-12. *Rectivertex saccatus* Guo et Liang, sp. nov. 1. head and thorax (dorsal view); 2. head (ventral view); 3. head and pronotum (lateral view); 4. pygofer (posterior view); 5. pygofer (lateral view); 6. diaphragm (posterior view); 7. paramere, left side (lateroventral view); 8. paramere, left side (lateral view); 9. aedeagus (dorsal view); 10. aedeagus (right view); 11. right tegmina (brachypter.); 12. right tegmina (macropter.). Scale bars = 0.1 mm in figures 1-10, 0.2 mm in figure 11, and 0.4 mm in figure 12.

between lateral carinae at anterior margin (♂ 1:1.1, ♀ 1:1.3). Mesonotum longer than vertex and pronotum together, lateral carinae not distinct, median carina reaching distal scutellum, longer than scutellum (♂ 2.5:1, ♀ 2.9:1), mesonotum including tegulae wider than length at midline (about ♂ 1.5:1, ♀ 1.6:1). Basitarsus of hind leg longer than other two tarsi together. Post-tibial spur with about 15 teeth.

Male genitalia. Pygofer with opening slightly ring-like, in profile lateral margin concave medially, laterodorsal angle and ventral margin slightly angularly produced. Aedeagus short, in right lateral view saccate, flat vertically and tall, with a ventral process at base, concave near base then convex dorsally and ventrally. Parameres small, in posterior view spinous, slightly flat, gradually tapering from base to apex and obliquely flexing dorsad.

Female. Mesonotum orange brown, abdomen light black brown, legs yellow brown, slightly black. Apical area of tegmen brown. Base of first valvifer semicircular.

Holotype ♂ (Macropter.), China, Hebei: northern Xiaowutaishan, 1800–2400 m, 14-viii-1964 (Y.-H. Han) (IZAS).

Paratypes. 1♀ (Macropter.), China, Hebei: northern Xiaowutaishan, 1800–2400 m, 14-viii-1964, (Y.-H. Han); 1♂ (Brachypter.), 2♀♀ (Macropter.), same locality, but 1400–2700 m, 16-viii-1964 (Y.-H. Han); 1♀ (Brachypter.), China, Hebei: Xiaowutaishan, 1200 m, 23-vi-1964 (Y.-H. Han). 2♀♀ (Brachypter.), China, Xinjing: Hejing, 2030 m, 31-vii-1958 (C.-Q. Li). 2♀♀ (Macropter.), China, Sichuan: Maerkang, 3230 m, 12-vii-1961 (F.-S. Li) (all IZAS).

Etymology. The name of this species is derived from the Latin: *saccatus*, referring to its saccate aedeagus.

Distribution. China: Hebei, Xinjing, Sichuan.

Genus *Micistylus* Guo et Liang, gen. nov.

Type species: *Micistylus triprocerus* Guo et Liang, sp. nov., by present designation.

Diagnosis. Vertex with sub-median carinae arising from near middle, not uniting at apex of vertex, Y-shaped carina distinct. Frons widest at level of ocelli, lateral carinae paralleled below level of ocelli, median carina forked at base. Antennae surpassing frontoclypeal suture. Pronotum with lateral carinae not reaching hind margin. Spinal formula of hind leg 5-8-4. Pygofer with opening elliptical, medioventral process present. Aedeagus tubular, with flagellum near apex. Diaphragm with dorsal margin angularly concave medially. Parameres small.

Description. Head including eyes about as wide as pronotum, in profile connecting with frons at arched right angle. Vertex with sub-median carinae arising from near middle part, not uniting at apex of vertex, stem of Y-shaped carina distinct. Frons length at midline double the width at widest part, widest at level of ocelli, lateral carinae almost parallel below level of ocelli, median carina forked at base. Rostrum reaching meta-coxae. Antennae surpassing frontoclypeal suture, reaching median postclypeus. Pronotum with lateral carinae not reaching hind margin. Tegmen without pterostigma. Spinal formula of hind leg 5-8-4.

Male genitalia. Pygofer with opening elliptical, not well defined, medioventral process present. Aedeagus tubular, with flagellum near apex, directed cephalad. Suspensorium inverted Y-shaped. Diaphragm with dorsal margin concave medially. Parameres small, simple. Anal segment with lateroapical angle strongly produced, broad tippet-form.

Etymology. The generic name is derived from the Latin: *mic* and *stylus*, referring to the genus having small parameres.

Distribution. China: Yunnan.

Remarks. This genus is similar to *Paraconon* Yang, *Euidopsis* Ribaut and *Thymalops* Fennah, but differs in the frons with lateral carinae parallel below level of ocelli, median carina forked at base, and spinal formula of hind leg 5-8-4 (in the latter three

genera, frons widest at about level of ocelli, median carina forked at about level of ocelli, and spinal formula of hind leg 5-7-4). In addition, in *Micistylus* Guo et Liang pygofer with medioventral process large and long, diaphragm with dorsal margin angularly concave medially. In *Paraconon* pygofer with medioventral process stout and diaphragm narrow, with dorsal margin convex. In *Thymalops* pygofer with medioventral process rounded apically and strongly incised evenly on both sides, diaphragm broad and membranous, with dorsal margin shallowly concave. In *Euidopsis* pygofer with diaphragm wide, knot-like, and produced caudad.

Micistylus triprocerus Guo et Liang, sp. nov.

(Figs. 13-24)

Description. Macropter. male. Body length: 3.3 mm, length (including teg.): 5.7 mm, tegmen: 4.8 mm.

Color. General color brown, abdomen pale brown but abdominal segments with lateral hind margin of tergite and sternite pale yellow brown. Tegmen yellow brown, transparent, area between vein M and Cu₁, membranous area between vein M₂ and M₃ and Sc₁ and Sc₂ at anterior margin, respectively, dark brown.

Structure. Vertex submedially shorter than width at base (1:2.4), at midline shorter than width at base (1:1.4), stem of Y-shaped carina distinct. Basal compartment wider at base than its greatest length (2.1:1), and wider than stem of Y-shaped carina (2.8:1). Frons length at midline double the width at widest part, widest at level of ocelli, lateral carinae subparallel below ocelli, median carina forked at base. Postclypeus in profile not prominent, at base about as wide as frons at apex, at midline shorter than frons (about 1:1.5). Antennae with first segment cylindrical, as twice long as width at apex, second segment longer than first (1.8:1). Pronotum about as half long as vertex, at midline shorter than width between lateral carinae at anterior margin (0.6:1). Mesonotum longer than vertex and pronotum together, median carina reaching distal scutellum, at midline longer than scutellum about 2.5:1, mesonotum including tegulae about 1.6 times wide as length at midline. Basitarsus of hind legs longer than other two tarsi together. Post-tibial spur with 24 teeth.

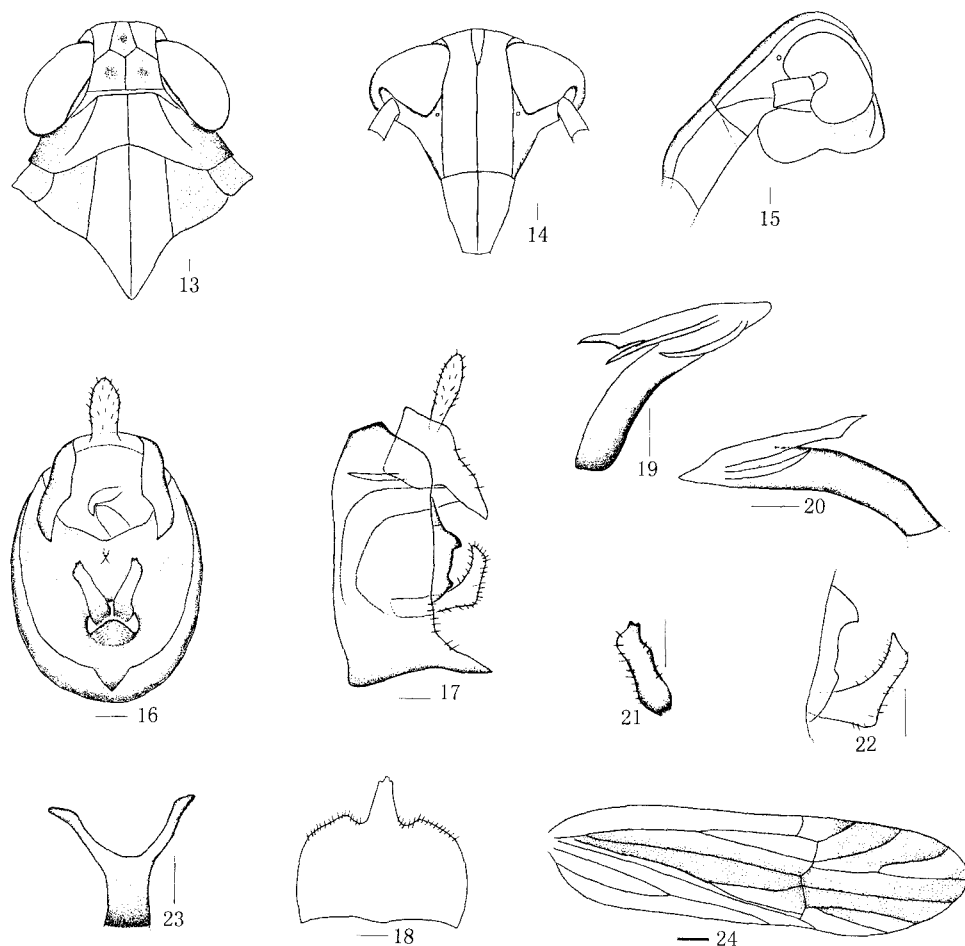
Male genitalia. Pygofer with ventrolateral margin slightly concave. Medioventral process large and long, tapering from base to apex, with three fine teeth at apex. Aedeagus flat transversely, tubular, in left dorsolateral view with an anteriorly directed flagellum arising near apex, the flagellum with basal 3/4 broadly flattened, parallel with aedeagus, apical 1/4 acute, flexing caudad obliquely, approximately reaching middle of aedeagus; with a flattened long spine near apex, and at right side with a short cephalad directed spine at apex. Suspensorium inverted Y-shape, with stem long and curved, arms obtuse apically. Diaphragm with dorsal margin angled, concave medially, posterior margin extremely prominent medially, angular in profile. In profile ventral margin of parameres flexing dorsad at right angle at 1/3 near base, tapering subapically, with dorsal margin concave caudad.

Holotype ♂ (Macropter.), China, Yunnan: Xishuangbanna, Yunjinghong, 900 m, 27-v-1958 (Y.-R. Zhang) (IZAS).

Paratype. 1 ♂ (Macropter.), same locality and altitude, but 25-vi-1958 (Y.-R. Zhang) (IZAS).

Etymology. The name of this species is derived from the Latin: *procerus* and prefix *tri-*, referring to its aedeagus with three spinose processes.

Distribution. China (Yunnan).



Figures 13–24. *Micistylus triprocerus* Guo et Liang, sp. nov. 13. head and thorax (dorsal view); 14. head (ventral view); 15. head and pronotum (lateral view); 16. pygofer (posterior view); 17. pygofer (lateral view); 18. pygofer (ventral view); 19. aedeagus (dorsal view from left); 20. aedeagus (right view); 21. paramere (left side, posterior view); 22. paramere and diaphragm (left side, lateral view); 23. suspensorium (dorsal view); 24. right tegmina (macropter.). Scale bars = 0.1 mm in figures 13–23, 0.4 mm in figure 24.

ACKNOWLEDGMENTS

The work was supported by the Hundred Talent Program from the Chinese Academy of Sciences (grant number A2903077), the National Natural Sciences Foundation of China (grant number 30370187), and the National Science Fund for Fostering Talents in Basic Research (NSFC-J0030092), all awarded to APL.

LITERATURE CITED

- Fennah, R. W. 1965. Delphacidae from Australia and New Zealand (Homoptera: Fulgoroidea). *Bulletin of the British Museum (Natural History)*, *Entomology Series* 17(1):1–59.
 Fennah, R. W. 1973–75. Homoptera: Fulgoroidea, Delphacidae from Ceylon. *Entomologica Scandinavica (Supplementum)* 4:79–136.

- Fennah, R. W. 1978. Fulgoroidea (Homoptera) from Viet-nam. *Annales Zoologici, Warszawa* 34(9):207–279.
- Kuoh, C.-L., Ding, J.-H., Tian, L.-X. & C.-L. Hwang. 1983. Economic Insect Fauna of China, Fasc. 27, Homoptera: Delphacidae. Beijing: Science Press.
- Liang, A.-P. 1996. Taxonomic changes in Chinese Lophopidae with a check list of Chinese species (Homoptera: Fulgoroidea). *Pan-Pacific Entomologist* 72:145–151.
- Liang, A.-P. 1998. On the Eurasian planthopper genus *Asiraca* Latreille (Homoptera: Auchenorrhyncha: Fulgoromorpha: Delphacidae). *Reichenbachia* 32:187–196.
- Liang, A.-P. 2002. New taxa of Vizcayinae (Hemiptera: Auchenorrhyncha: Delphacidae), including a remarkable new genus from China. *Journal of Natural History* 36:601–616.
- Liang, A.-P. & G.-M. Jiang. 2002. *Punana sinica* new species and first record of the genus from China (Hemiptera: Fulgoroidea: Delphacidae). *Florida Entomologist* 85(2):351–355.
- Liang, A.-P. & G.-M. Jiang. 2004. Discovery of the genus *Arcofaciella* Fennah (Hemiptera: Fulgoroidea: Delphacidae) in the mainland China. *Journal of the New York Entomological Society* 112(4):221–226.
- Yang, C.-T. 1989. Delphacidae of Taiwan (II) (Homoptera: Fulgoroidea). *National Science Council Special Publication, Taipei* 6:1–334.
- Yang, J.-Z. & C.-T. Yang. 1986. Delphacidae of Taiwan (I) Asiracinae and the tribe Tropidocephalini (Homoptera: Fulgoroidea). *Taiwan Museum Special Publication, Taipei* 6:1–79.

Received 8 Dec 2004; Accepted 8 July 2006. Publication date 22 Dec 2006.