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PUNANA SINICA NEW SPECIES AND FIRST RECORD OF THE GENUS FROM CHINA (HEMIPTERA: FULGOROIDEA: DELPHACIDAE)

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ABSTRACT

Punana sinica Liang sp. nov. (Hemiptera: Fulgoroidea: Delphacidae) is described and illustrated from Sichuan, southwest China. This represents the first record of the genus *Punana* Muir from China and the fifth known species of *Punana*. The new taxon extends the range of the genus *Punana* northward considerably, previously known only from southeast Asia and south India. A key for separation of the species of *Punana* is included.

Key Words: *Punana*, new species, Delphacidae, Fulgoroidea, China

RESUMEN

Se describe y se ilustra *Punana sinica* sp. nov. (Hemiptera: Fulgoroidea: Delphacidae) de Sichuan, en el suroeste de China. Este representa el primer registro del género *Punana* Muir en China y la quinta especie de *Punana* conocida en el mundo. Este nuevo taxón extiende la distribución geográfica del género *Punana* hacia el norte considerablemente, que antes se conocía solamente en el suroeste de Asia y en el sur de la India.

The Delphacidae is the largest family of the Fulgoroidea, comprising more than 2000 described species in approximately 300 genera and six subfamilies worldwide (Asche 1985, 1990). Members of the group are predominantly monocot-feeders and a few are major agricultural pests on grasses, such as rice, maize, and sugarcane (Wilson & O'Brien 1987, Wilson et al. 1994).

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 only a small fraction of the actual diversity of the whole Chinese delphacid fauna considering the vast territory and various complex habitats of China.

The basal delphacid taxa, the Asiracinae and Vizcayinae, of Delphacidae in the Chinese fauna have received very little attention. To date, only six species in four genera from the Asiracinae (Asiracini, Ugyopini) and Vizcayinae are described or recorded from China, e.g., *Asiraca choui* (Yuan & Wang) (Shaanxi in central China), *A. clavicornis* (F.) (Xinjiang in northwest China), *A. granulipennis* (Kato) (Manchuria and Jinlin in northeastern China), and *Ugyops zoe* Fennah (Hainan Island in south China), all belonging in the Asiracinae, and *Vizcaya longispinosa* Liang (Yunnan in southwest China) and *Neovizcaya sinica* Liang (Yunnan in southwest China) of the subfamily Vizcayinae (Fennah 1956, Asche 1985, 1990, Liang 1996, 1998, 2002).

The genus *Punana* was described by Muir (1913) for *P. brunnea* Muir from Borneo. Asche (1983) correctly separated *Punana* from *Neopunana* (8 species, the Caribbean) and *Equasystatus* (monotypic, Ecuador). Four species are currently included in the genus from Borneo, Philippines (Luzon, Negros), and south India (Muir 1913, 1916, Distant 1916, Metcalf 1943, Asche 1983, 1985). Asche (1985) placed *Punana* Muir in the tribe Ugyopini Fennah 1979 of the subfamily Asiracinae Motschulsky 1863. However, Emeljanov (1995) upgraded the Ugyopini to the subfamily rank and recognized three tribes in the Ugyopinae, e.g., Neopunanini Emeljanov 1995, Eodelphacini Emeljanov 1995 and Ugyopini. *Punana* Muir was placed by Emeljanov (1995) in the tribe Eodelphacini together with *Eodelphax* Kirkaldy 1901, *Ostama* Walker 1857, *Paranda* Melichar 1903, *Melanesia* Kirkaldy 1907, *Livatiella* Fennah 1956 and *Prolivatis* Emeljanov 1995. Eodelphacini is characterized by the distal part of the aedeagal shaft arched clockwise (from the base curved to the left); the presence of a row of teeth on the metatarsomere II, in which the marginal teeth are considerably longer than all others; the presence of the sinus on the hindwings opposite CuAP; forewings without postnodal transverse veins; the presence of a well-defined bend of the membrane when the wings are folded; and the intermediate carinae of mesonotum straight (Emeljanov 1995).

In the present paper the senior author describes a new species of the genus *Punana* Muir which was recently found in Sichuan, southwest China. The new species represents the first record

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of *Punana* in China, and its discovery has broadened our knowledge of the morphology and biogeography of the genus, as well as that of the primitive delphacid taxa in the Chinese fauna.

Materials and Methods

The specimen used in this study is from the Insect Collection of the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS).

Morphological terminology follows that of Kramer (1950) and Asche (1985).

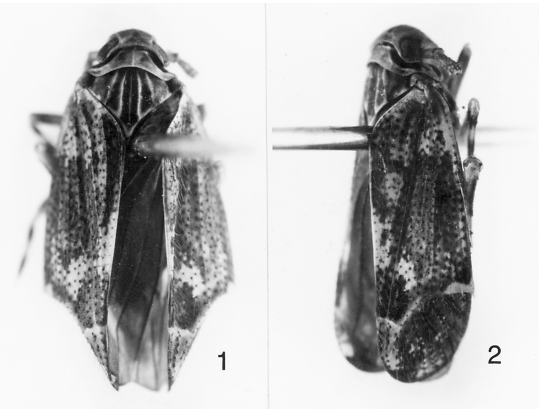
Descriptive Taxonomy

Punana Muir

Punana Muir, 1913: 249. Type species: *P. brunnea* Muir, 1913, by original designation.

Onkelos Distant, 1916: 137. Type species: *O. annulatus* Distant, 1916, by original designation and monotypy. [Synonymized by Muir, 1919: 6.]

Head (Figs. 1, 3, and 4) relatively broad, broadly roundly produced anteriorly. Vertex (Figs. 1 and 3) very short, broader than long, disk foveate with a median carina (very faint in *P. sinica* sp. nov.) and two sublateral carinae which meet anteriorly with the extreme apical part incised posteriorly. Frons (Fig. 4) longer than broad, anterior margin truncate, convex medially, lateral marginal areas depressed, centrally finely carinate. Postclypeus (Fig. 4) more than half length of frons, convex medially, lateral marginal areas depressed, with median longitudinal carina. Anteclypeus (Fig. 4) very narrow and convex, with median carina. Rostrum long, reaching between hind trochanters, basal segment relatively long, apical segment relatively short, greater than 1/2 length of basal segment. Antennae (Figs. 1, 3, and 4) moderately long, scape and pedicel with many sturdy bristles on surface, scape shorter than pedicel, with base distinctly narrow, strongly broadening toward apex, apex distinctly broad; pedicel cylindrical with base slightly flattened, with about 18 sensory fields. Pronotum (Figs. 1 and 3) centrally slightly shorter than head, disk slightly sloping anteriorly, anterior lateral areas strongly sloping laterad, hind margin centrally slightly arched anteriorly, with median longitudinal carina. Mesonotum (Figs. 1 and 3) longer than head and pronotum combined, with five longitudinal carinae on disk, extreme apex somewhat lobately produced. Legs moderately long, hind tibiae with three lateral spines on outer edge, five apical spines (the outer one largest and the middle one smallest) and a long apical conical mobile spur, metatarsomere I with 5 apical spines: four spines in a row and the fifth, middle spine, shifted proximally from the row, metatarsomere II with 3 apical spines (outer side 2, inner side 1). Forewings (Figs. 1 and 2) relatively narrow and elongate, about 3 times as long as broad, obliquely depressed laterally, apices broadly angulate, veins distinctly prominent and thickly covered with fuscous granules with long setae, a more or less continuous series of transverse veins before apical area. For forewing and hindwing venation see Asche (1985: fig. 204).



Figs. 1-2. *Punana sinica* Liang sp. nov. 1. male holotype, dorsal view; 2. same, lateral view.

Male genitalia. See description of *Punana sinica* Liang sp. nov. below and Asche (1985: figs. 393, 441, 442).

Remarks. The above generic description was based on the specimen of the new species described below.

Punana is distinguished from other genera in the tribe Eodelphacini by the shape and length of the antennae, the shape of vertex and frons, the number of longitudinal carinae on mesonotum, the number of lateral spines on hind tibiae, the wing venation, and the minutiae of the male genitalia, as noted above.

Punana can be distinguished from *Melanesia* Kirkaldy (7 species, Borneo, Philippines and Fiji) and *Paranda* Melichar (monotypic, Sri Lanka) by the hind tibiae having 3 lateral spines (2 in *Melanesia* and *Paranda*) and the antennal pedicel distinctly short (distinctly elongate in *Melanesia* and *Paranda*). It can be distinguished from *Eodelphax* Kirkaldy (2 species, Sri Lanka) by the antennal scape and pedicel subcylindrical (both scape and pedicel compressed and scape obliquely triangular in *Eodelphax*). *Punana* differs from *Prolivatis* Emeljanov (monotypic, Vietnam) in the antennal pedicel short (relatively long in *Prolivatis*) and the male parameres relatively broad (very slender and narrow in *Prolivatis*). It differs from *Ostama* Walker [2 species, Borneo, Mentawi Island (East Indies)] in the antennae short (very elongate in *Ostama*), mesonotum with 5 carinae (3 in *Ostama*) and forewings with about 12 closed apical cells (about 15 in *Ostama*). *Punana* can be separated from *Livatiella* Fennah (2 species, eastern Caroline Island) by the forewing with Sc+R with two branches before subapical transverse

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nodal line (one branch in *Livatiella*) and the hindwing with the apical cell enclosed by M_3 and M_4 relatively long and large (very short and small in *Livatiella*).

Included species and distribution. Five species; *P. annulata* (Distant, 1916) (south India), *P. brunnea* Muir, 1913 (Borneo), *P. negrosensis* Muir, 1916 [Philippines (Negros)], *P. philippina* Muir, 1916 [Philippines (Luzon)], and *P. sinica* sp. nov. [southwest China (Sichuan) (new record)].

A key to the known species of *Punana* is provided below.

KEY TO SPECIES OF *PUNANA* MUIR

1. Antennae with three dark rings (Muir 1913); Borneo. . . . . *brunnea* Muir
—Antennae without dark rings 2

2. Forewings with distinct stramineous suffusions, especially on basal, subapical and apical areas 3
—Forewings without distinct stramineous suffusions 4

3. Vertex (Figs. 1-3) shorter and broader with anterior margin shorter and more rounded; male pygofer (Figs. 5 and 6) with a large median triangular process on ventrocaudal margin; and parameres (Figs. 5, 8, and 9) distinctly angulately produced laterad near midlength in ventral aspect; southwest China (Sichuan) . . . . . *sinica* Liang sp. nov.
—Vertex relatively long, relatively distinctly produced anteriorly (Distant 1916: Fig. 98; Asche 1985: Figs. 11c, 161); male pygofer without distinct process on ventrocaudal margin (Asche, 1985: Fig. 393); parameres not angulately produced laterad near midlength in ventral aspect (Asche 1985: Fig. 441); south India . . . . . *annulata* (Distant)

4. Male pygofer with median process on ventrocaudal margin angular (Muir 1916); fore and middle coxae and femora very light brown; clavus without fuscous spots; Philippines (Luzon). . . . . *philippina* Muir
—Male pygofer with median process on ventrocaudal margin square (Muir 1916); fore and middle coxae and femora dark brown; clavus with a small fuscous spot; Philippines (Negros) . . . . . *negrosensis* Muir

Punana sinica Liang sp. nov.
(Figs. 1-10)

Holotype male, CHINA: Sichuan, Wan County (30°8'N, 108°3'E), 1200 m, 27.v.1994 (Jin Yao) (IZCAS).

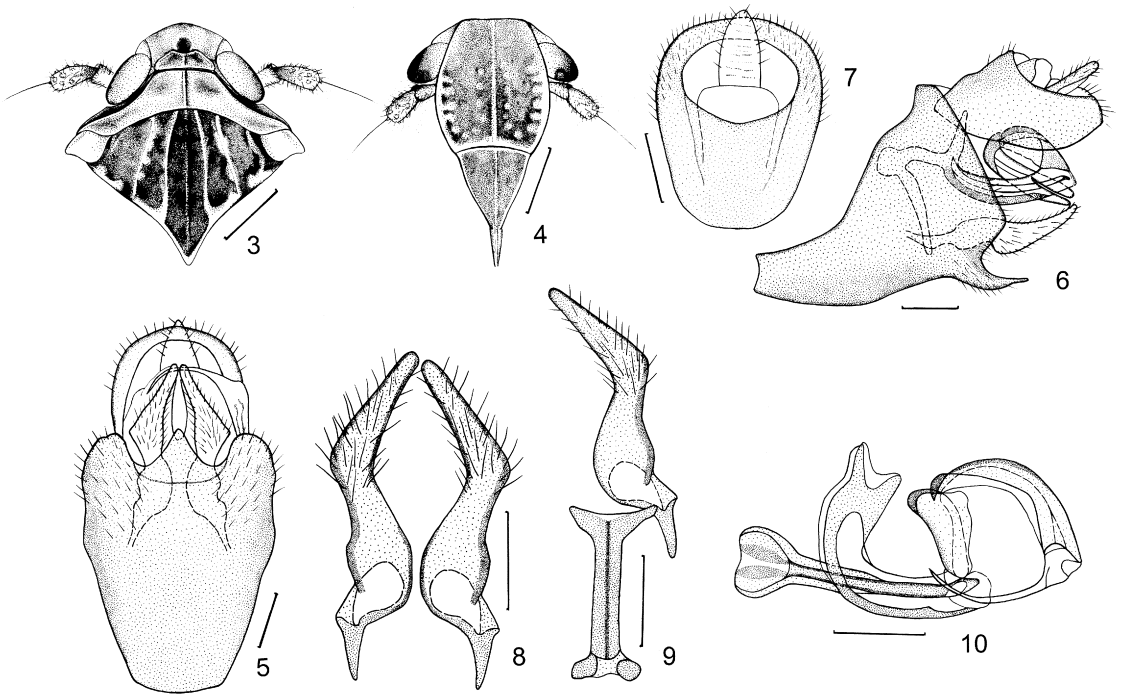
Description. Length (from apex of vertex to tip of forewings): male 5.8 mm.

Vertex, frons, postclypeus and anteclypeus brownish, the pit on frons in front of vertex darker, frons (Fig. 4) with two columns of small rounded pale spots (one next to median longitudinal carina and the other on lateral margin), epistomal suture ochraceous, genae and lora ochraceous with the latter suffused with fuscous. Antennae ochraceous with apex of scape and pedicel suffused with brown, scape and pedicel covered with long brownish sturdy bristles. Rostrum with basal segment ochraceous, apical segment brown with extreme apex black. Pronotum ochraceous with anterior lateral depressed areas blackish brown. Mesonotum (Figs. 1 and 3) fuscous or blackish brown, with longitudinal carinae (excluding the median carina), posterior lateral margins and extreme apex ochraceous. Thorax ventrally ochraceous, pleurae with fuscous spots. Legs ochraceous with dark brown or fuscous suffusion, femora dark brown or fuscous (hind femora much paler), tibiae with two broad fuscous rings basally and medially respectively (those on hind tibiae much paler), tarsi and claws brown (hind tarsi and claws much paler), tips of apical spines on hind tibiae and tarsi black. Forewings (Figs. 1 and 2) fuscous brown, with irregular stramineous suffusions mainly on basal, subapical and apical areas, granules on veins fuscous, setae in granules on veins pale yellowish brown; hindwings pale fuliginous, veins brown. Abdomen with tergites brown and sternites ochraceous with anterior margin broadly brown.

Structural characters as in generic description, but vertex with disk short and transversely broad, with very faint median longitudinal carina, frons with a very small shallow rounded pit dorsally, and pronotum shorter than vertex medially.

Male genitalia with pygofer (Fig. 5) in ventral view with apical 2/5 broad and nearly parallel-sided, narrowing to base over basal 3/5, ventrocaudal margin broadly excavated with a large median triangular process. Pygofer (Fig. 6) in lateral view elongate, very short anteriorly and very high posteriorly, dorsal margin very short and ventral margin very long. Parameres (Figs. 5, 6, 8, and 9) slender and elongate, distinctly angulately produced laterad near midlength in ventral aspect, base relatively broad, tapered to apex, somewhat constricted medially, apical 1/2 directed inwardly and covered with long hairs on surface. Connective (Fig. 9) relatively short, slender, parallel-sided, apex and base expanded laterad. Aedeagal shaft (Figs. 5, 6, and 10) nearly C-shaped with basal 1/2 compressed and apical 1/2 spinous; gonopore at midlength on dorsal surface. Suspensorium (Fig. 10) long, compressed, base ring-shaped, embracing base of aedeagus, apical part curved and broad with apex bluntly forked. Anal tube (Figs. 6 and 7)

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Figs. 3-10. *Punana sinica* Liang sp. nov. 3. head, pronotum and mesonotum, dorsal view; 4. head, ventral view; 5. pygofer, ventral view; 6. pygofer, lateral view; 7. anal segment, caudal view; 8. genital styles, ventral view; 9. genital style and connective, ventral view; 10. aedeagus, lateral view. Scale bars = 0.5 mm in Figs. 3, 4 and 0.2 mm in Figs. 5-10.

short and broad, gradually widening from base to apex in dorsal aspect, apex without appendages, anal style slender, small and short.

Female. Unknown.

Etymology. This new species is named *sinica* after the Latin *sinicus*, adjective ("of China"), referring to its occurrence in China.

Distribution. Southwest China (Sichuan).

Remarks. This new species is externally similar to *P. annulatus* (Distant) from south India (Kodaikanal), which was illustrated by Distant (1916) and Asche (1983, 1985), but differs from the latter in having the antennal pedicel subcylindrical and in the shape of the vertex, male genitalia and pygofer, as noted in the above key.

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