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Authors: Chen, Xiang-Sheng, Li, Zi-Zhong, and Tsai, James H.

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## TWO NEW SPECIES OF *CARISTIANUS* (HEMIPTERA: FULGOROIDEA: ACHILIDAE) FROM MAOLAN NATIONAL NATURE RESERVE IN GUIZHOU, CHINA

XIANG-SHENG CHEN<sup>1 2</sup>, ZI-ZHONG LI<sup>1</sup> AND JAMES H. TSAI<sup>3</sup>

<sup>1</sup>Institute of Entomology, Guizhou University, Guiyang, Guizhou Province 550025, P.R. China

<sup>2</sup>Institute of Zoology, Chinese Academy of Sciences, Beijing 10080, P.R. China

<sup>3</sup>Fort Lauderdale Research and Education Center, IFAS, University of Florida  
3205 College Avenue, Fort Lauderdale, FL 33314, USA

### ABSTRACT

Two new species of *Caristianus* Distant (Hemiptera: Fulgoroidae: Achilidae), *C. maolanensis* Chen and Li **sp. nov.** and *C. liaoi* Chen and Tsai **sp. nov.**, are described from specimens collected in Maolan National Nature Reserve in Guizhou Province, China. Male genitalia of the new species are illustrated and a dorsal habitus is provided for the male of *C. maolanensis*. A key for identifying the species of *Caristianus* is included.

Key Words: *Caristianus*, new species, Achilidae, Hemiptera, Southwest China

### RESUMEN

Se describen dos nuevas especies de *Caristianus* Distant (Hemiptera: Fulgoroidae: Achilidae), *C. maolanensis* Chen y Li **sp. nov.** y *C. liaoi* Chen y Tsai **sp. nov.**, de especímenes recolectados en la Reserva Natural Nacional de Maolan en la Provincia de Guizhou, China. Las genitales de los machos de estas especies nuevas son ilustradas y se provee una ilustración del hábitus dorsal del macho de *C. maolanensis*. Se incluye una clave para identificar las especies del género *Caristianus*.

The genus *Caristianus* was established by Distant (1916) based on specimens of *C. indicus* Distant from Ceylon. Ten species, including 1 variety, were formerly recorded in the world, mainly in the Oriental region and the Palearctic region (China, Borneo, Ceylon, India, Philippines, Sarawak, Kalimantan, Afghanistan and Japan) (Distant 1916; Fennah 1949, 1950, 1956, 1965; Ishihara 1954; Dlabola 1957; Chou et al. 1985, 1994; Chen & Lin 2001).

To date, the majority of species in the genus, with the exception of *C. japonicus* Ishihara (Japan: Shikoku) and *C. cardinalis* Fennah (Philippines: Luzon), are described from specimens collected in China, namely *C. indicus* Distant (Jiangxi), *C. ulysses* Fennah (Sichuan, Yunnan), *C. fopingensis* Chou et al. (Shaanxi), *C. ziyangensis* Chou et al. (Shaanxi, Yunnan), *C. asymmetries* Chou et al. (Yunnan), *C. symmetries* Chou et al. (Yunnan), *C. nigripectus* Chou et al. (Yunnan), and *C. jilinensis* Chou et al. (Jilin) (Fennah 1956; Chou et al. 1985, 1994; Chen & Lin 2001).

During the course of studying biodiversity in Maolan National Nature Reserve in Guizhou Province, southwest China, two fulgorid specimens belonging to the unknown species of the genus *Caristianus* Distant were found. The purpose of this paper is to describe two new species and to

provide an identification key to the species of *Caristianus*.

### MATERIALS AND METHODS

Morphological techniques and terminology follows Fennah (1950) and Chou et al. (1994). Specimens examined are deposited in the Insect Collection at the Institute of Entomology, Guizhou University, Guiyang, Guizhou Province, China (IEGU).

### DESCRIPTIVE TAXONOMY

#### *Caristianus* Distant

*Caristianus* Distant, 1916, 6: 63. Type species: *C. indicus* Distant, 1916, by original designation.

*Caristianus* Distant: Fennah, 1950, Bull. Brit. Mus. (N.H.) Ent., 1:103.

*Caristianus* Distant: Chou et al., 1994, Entomotaxonomia, 16(1): 38.

The distinctive characters used by Fennah (1950) and Chou et al. (1994) are modified as follows:

Head with eyes distinctly narrower than pronotum. Vertex slightly declivous, longer in

middle than broad across base (1.2-1.9:1), produced before eyes for about half of their length; median carina present, obsolete distally; disk strongly depressed; anterior margin carinate, strongly convex; lateral margins carinate, straight, diverging basad; posterior margin transverse. Frons moderately convex in profile, longer in middle line than broad (1.3-1.9:1), widest part about three times as wide as base; basal margin convex-truncate; median carina distinct, percurrent; lateral margins carinate, sinuately diverging to level of antennae then gradually incurved to suture, rather obliquely foliate; disk of frons not depressed. Clypeus more than half as long as frons, medially and laterally carinate. Rostrum with subapical segment shorter than apical. Antennae subglobose, not sunk in a depression. Ocelli touching eyes. Eyes distinctly excavate beneath, only slightly overlapping pronotum.

Pronotum moderately short, about as long behind eyes as in middle line; anterior margin of disk truncate, posterior margin angulately excavate; median carina present; lateral carinae of disk straight, diverging basad, attaining hind margin, each not quite as long as median carina; two incomplete carinae between eye and tegula; pronotum laterad of disk slightly inclined antero-ventrally; ventral margin of lateral lobes slightly oblique. Mesonotum longer than vertex and pronotum together, tricarinate, lateral carinae straight, weakly divergent. Tegulae not carinate. Posttibiae with a single spine basad of middle.

Tegmina 3 times as long as broad, costal margin slightly convex; Sc+R fork near basal quarter, basad of union of claval veins; M forked level with node; Cu1 fork basad of apex of clavus and distad of union of claval veins; 7 apical areoles distad of stigma. Clavus terminating distad of middle.

KEY TO SPECIES OF *Caristianus* DISTANT

- 1. Pronotum and mesonotum with lateral areas outside lateral carinae blackish brown or purplish brown, central areas ivory-yellow or milky white (Fig. 1; Chou et al. 1994: Fig. 1: E; Ishihara 1954: Fig. 16: 1); costal areas of tegmina with ivory-yellow longitudinal band, enlarging from base to apex (Fig. 1; Chou et al. 1994: Fig. 1: E; Distant 1916: Fig. 48) ..... 2
- Pronotum and mesonotum blackish or stramineous (Fig. 8); costal areas of tegmina without ivory-yellow longitudinal band, but with some milky white markings (Fig. 10; Ishihara 1954: Fig. 16: 4; Fennah 1965: Fig. 68) ..... 10
- 2. Frons almost blackish brown or brown (Fig. 2; Chou et al. 1994: Fig. 1: F; Distant 1916: Fig. 48) ..... 3
- Frons blackish brown or purplish brown, except apically with yellowish white transverse band (Fig. 9; Ishihara 1954: Fig. 16: 2; Fennah 1965: Fig. 66) ..... 7
- 3. Median carina of frons distinct, percurrent; clypeus without yellow transverse markings or only with 1 small yellow or milky white markings at apical-lateral angle ..... 4
- Median carina of frons only basal ¼ distinct; clypeus with 1 grayish white transverse marking basally (Chou et al. 1994: Fig. 1: F) ..... *C. fopingensis*
- 4. Sc+R of tegmina fork near base; costal areas with ivory-yellow longitudinal band from near base to near apex, long and broad (Fig. 1) ..... 5
- Sc+R of tegmina fork at middle; costal areas with ivory-yellow longitudinal band from near middle to near apex, short and narrow, and with 1 small ivory-yellow triangular marking before this band ..... *C. asymmetries*
- 5. The apical cells of tegmina banded with grayish white color (Distant 1916: Fig. 48) ..... *C. indicus*
- The apical cells of tegmina banded with red color. .... 6
- 6. Clypeus with apex ivory-yellow (Fig. 2); tegmina with 1 small blackish brown marking near apex of Sc1 (Fig. 1); body smaller (length including tegmina 3.8 mm) ..... *C. maolanensis*
- Clypeus purplish brown (Chou et al. 1994: Fig. 6: F); tegmina without blackish brown marking near apex of Sc1 (Chou et al. 1994: Fig. 6: A); body larger (length including tegmina 6.9 mm) ..... *C. jilinensis*
- 7. The yellowish white transverse band of frons broad (more than ⅓ of frons); styles of aedeagus symmetrical ..... 8
- The yellowish white transverse band of frons narrow (only 1/5 of frons); styles of aedeagus asymmetrical (Chou et al. 1994: Fig. 4: A, B) ..... *C. symmetries*
- 8. Frons with apical ⅓ yellowish white (Ishihara 1954: Fig. 16: 2); Sc+R of tegmina fork near basal 2/5, costal areas with 1 small triangular marking before ivory-yellow longitudinal band (Ishihara 1954: Fig. 16: 4); body dark brown ..... *C. japonicus*

- Frons with apical  $\frac{1}{2}$  yellowish white; Sc+R of tegmina fork near middle, costal areas without small triangular markings before ivory-yellow longitudinal band; body purplish brown or light purplish brown . . . . . 9
9. Styles of aedeagus with 1 larger tooth near apex; aedeagus with 5 or 6 teeth on each side (Chou et al. 1994: Fig. 2: A) . . . . . *C. ziyangensis*
- Styles of aedeagus and aedeagus without teeth (Fennah 1956: Fig. 15: K) . . . . . *C. ulysses*
10. Vertex longer in middle than broad at base about 1.9:1 (Fennah 1965: Fig. 65); tegmina with 4 short longitudinal fuscous-piceous stripes at apical margin (Fennah 1965: Fig. 68); body of male light yellowish brown, of female scarlet . . . . . *C. cardinalis*
- Vertex longer in middle than broad at base about 1.25-1.4:1 (Fig. 8); tegmina without short longitudinal fuscous-piceous stripes at apical margin (Fig. 10); body blackish brown . . . . . 11
11. Frons purplish black; costal areas of tegmina with 3 small white markings; apex of aedeagus with 1 slender process on each side, directed laterad; styles of aedeagus as long as aedeagus, with apices crossing each other (Chou et al. 1994: Fig. 5: A) . . . . . *C. nigripectus*
- Frons with apical half milky white (Fig. 9); costal areas of tegmina with 1 large and 1 small marking, ivory-yellow (Fig. 10); aedeagus with subapically 2 processes, directed basad; styles of aedeagus shorter obviously than aedeagus, with apices diverging (Figs. 14-16) . . . . . *C. liaoi*

*Caristianus maolanensis* Chen et Li **sp. nov.**  
(Figs. 1-7)

**Description.** Body length (from apex of vertex to tip of abdomen): male 2.4 mm; including tegmen: male 3.8 mm; tegmen length: male 3.1 mm. Vertex subrectangular (Fig. 1), longer in middle than broad across base (1.3:1). Frons narrow triangle, longer in middle line than broad (1.7:1), median carina with apical  $\frac{4}{5}$  distinct (Fig. 2). Rostrum long, surpassing trochanter of median leg. Mesonotum longer than vertex and pronotum together (1.6:1). Sc+R of tegmina fork near basal  $\frac{1}{4}$ . Post-tarsomeres with segment I longer than II and III together (1.3:1).

Anal segment of male broad at base and narrow at apex, distal margin convex, notched at middle. Pygofer with each lateral margin produced near middle in 1 twisted digitate process, with 1 small tooth on its outer side (Figs. 3 and 4). Medioventral process deeply bifid, each limb long spine-like, diverging distally, with 1-2 small teeth on each outer side near basal  $\frac{1}{3}$  (Fig. 4). Aedeagus swelling at apex, lateral margin sinuate, with 7-8 small teeth on each side. In ventral view, aedeagus with 2 strong processes produced from apex, directed ventrocephalad. Styles of aedeagus symmetrical, as long as aedeagus, diverging at middle and closing to each other distally (Figs. 6 and 7). Genital styles moderately expanding distad, sinuate on ventral and dorsal margin, with 2 simple teeth near middle and apex of dorsal margin, one slender, sinuate process originating from ventral margin and directed dorsad (Fig. 5).

Vertex yellowish brown, except for two stripes laterally, and 1 stripe on each side of median carina distally brown. Frons blackish brown, except for apical angle milky white and 5 spots on lateral margin yellowish brown. Eyes blackish brown, ocelli yellowish brown, marginally tinted with

red. Antenna blackish brown. Clypeus blackish brown, except for apex ivory-yellow. Rostrum yellow, but apex blackish brown. Pronotum and mesonotum blackish brown, except for lateral carinae and areas between them yellowish brown. Tegmina infusate, middle of costal area with 1 milky white longitudinal band, in which 1 small brown spot near Sc; posterior margin of clavus milky white, inside of second claval vein with 5 small milky white spots; with veins in this area concolorous, except those veins of apical half of tegmina red. Wings slightly tinged light brown, with veins dark brown. Legs ivory-yellow. Abdomen blackish brown.

**Etymology.** This new species is named after the type locality, Maolan National Nature Reserve in Guizhou Province.

**Distribution.** Southwest China (Guizhou).

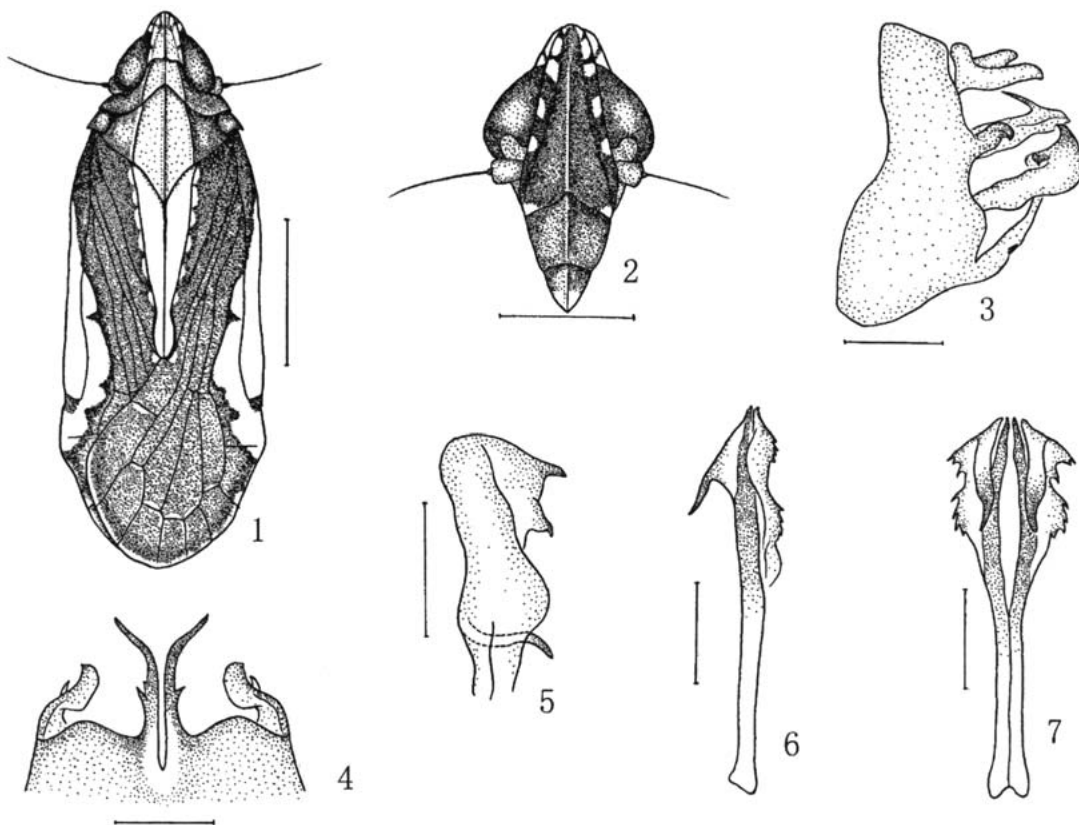
**Specimens examined.** Holotype male, CHINA: Guizhou, Maolan National Nature Reserve (25°40'N, 108°05'E), 600 m, 24-X-1998 (X.-S. Chen) (IEGU).

**Remarks.** This new species is similar to *C. asymmetries* Chou et al., but differs from the latter in: smaller body; tegmina with Sc+R fork near basal  $\frac{1}{4}$ ; veins of apical half red; apical half aedeagus symmetry; genital styles with slender process near base.

*Caristianus liaoi* Chen et Tsai **sp. nov.**  
(Figs. 8-16)

**Description.** Body length (from apex of vertex to tip of abdomen): male 2.2 mm, female 2.8 mm; including tegmen: male 3.7 mm, female 4.7 mm; tegmen length: male 3.0 mm, female 3.9 mm.

Vertex triangular, longer in middle than broad across base (1.4:1), with median carina, posterior margin slightly sinuate (Fig. 8). Frons broad triangle, longer in middle line than broad (1.3:1),



Figs. 1-7. *Caristianus maolanensis* Chen et Li **sp. nov.** 1. male holotype, dorsal habitus; 2. frons and clypeus; 3. pygofer and anal segment, left side; 4. pygofer, ventral view; 5. right genital style, lateral view; 6. aedeagus, lateral view; 7. aedeagus, ventral view. Scale bars = 1 mm (Fig. 1); 0.5 mm (Fig. 2); 0.2 mm (Figs. 3-7).

median carina with apical  $\frac{1}{3}$  distinct (Fig. 9). Rostrum long, surpassing trochanter of median leg. Mesonotum longer than vertex and pronotum together (1.5:1). Sc+R of tegmina forking near basal  $\frac{2}{5}$ . Post-tarsomeres with I segment longer than II and III together (1.2:1).

Anal segment of male broad at base and narrow at apex, distal margin concave roundly. Pygofer with each lateral margin produced near middle into tooth (Figs. 11). Medioventral process deeply bifid, each limb broad at base, acuate at apex, diverging distally (Fig. 12). Aedeagus swelling at apex, lateral margin slick, anterior margin with groove. In ventral view, aedeagus with 2 strong processes produced from subapical margin, directed ventrocephalad. Styles of aedeagus symmetrical, shorter than aedeagus, diverging distally (Figs. 14-16). Genital styles moderately expanding distad, sinuate on ventral margin, with 2 large cone-shaped teeth near apex of dorsal margin (Fig. 13).

Vertex yellowish brown, except for 2 stripes laterally, and a stripe on each side of median carina distally brown (Fig. 8). Frons with basal half

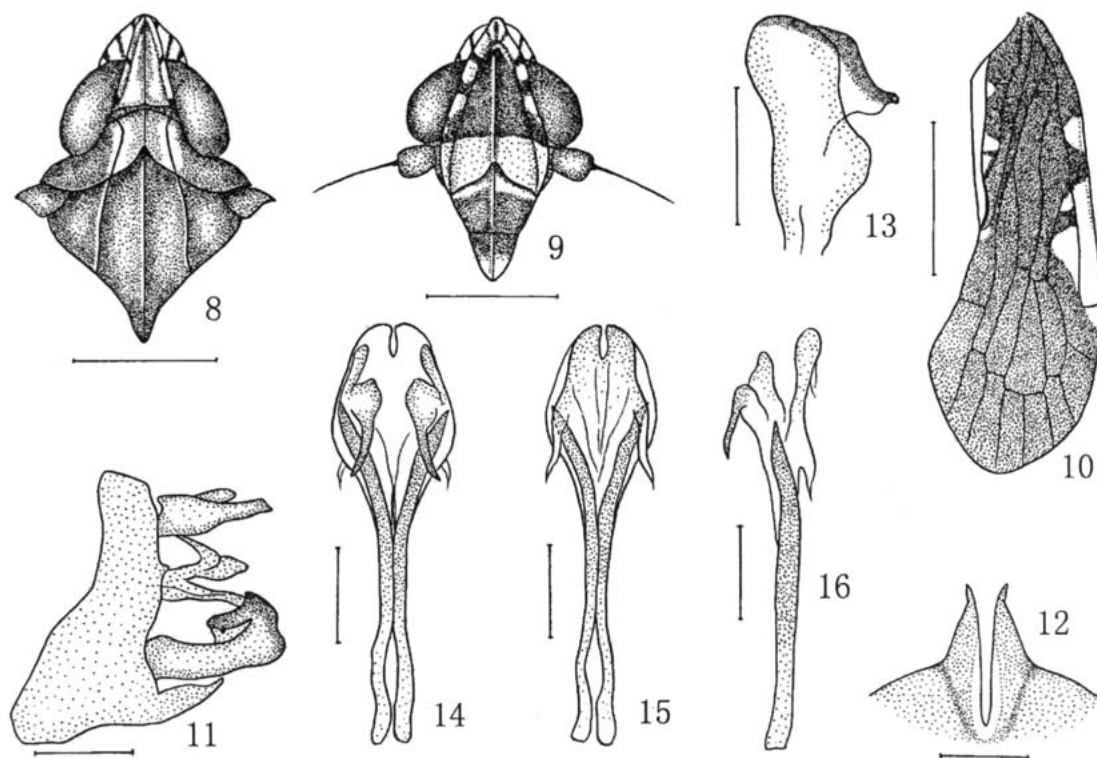
blackish brown, apical half milky white and 5 spots on lateral margin yellowish brown. Eyes reddish brown, ocelli yellowish brown. Antenna blackish brown. Clypeus blackish brown, except for basal margin ivory-yellow and apex yellowish brown. Rostrum yellowish brown, but apex blackish brown. Pronotum and mesonotum blackish brown, except for lateral carinae of pronotum yellowish brown (Fig. 8). Tegmina infusate, middle of costal area with 1 large milky yellow marking and 1 small milky yellow marking; posterior margin of clavus yellowish brown, inside of second claval vein with 3 milky white spots; with veins in this area concolorous (Fig. 10). Wings slightly tinged light brown, with veins dark brown. Legs yellowish brown. Abdomen blackish brown.

**Etymology.** This new species is named in honor of Ms. Q.-R. Liao, collector of the type specimens.

**Distribution.** Southwest China (Guizhou).

**Specimens examined.** Holotype male, CHINA: Guizhou, Maolan National Nature Reserve (25°40'N, 108°05'E), 600 m, 25-X-1998 (Q.-R. Liao) (IEGU). Paratype 3 females, same data as holotype.





Figs. 8-16. *Caristianus liaoi* Chen et Tsai **sp. nov.** 8. head and thorax, dorsal view; 9. frons and clypeus; 10. tegmen; 11. pygofer and anal segment, left side; 12. medioventral process of pygofer; 13. right genital style, lateral view; 14. aedeagus, ventral view; 15. aedeagus, dorsal view; 16. aedeagus, lateral view. Scale bars = 0.5 mm (Figs. 8-9); 1 mm (Fig. 10); 0.2 mm (Figs. 11-16).

**Remarks.** This species is similar to *C. cardinalis* Fennah, but differs from the latter in: vertex shorter (longer in middle than broad across base about 1.4×, not 1.9×); on tegmina, the base of costal cell without ivory yellow spots and the apical cells without short longitudinal fuscous-piceous stripes; pygofer with each lateral margin produced near middle in a tooth, not long process; medioventral process deeply bifid; aedeagus with two strong processes produced from subapical margin, directed ventrocephalad.

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