



A new leafhopper genus of Erythroneurini (Hemiptera, Cicadellidae, Typhlocybinae) from karst area in southwestern China

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ABSTRACT

Guizhou is regarded as one hotspot for China's Erythroneurini diversity, from where numerous rare new species have been, or are being, described. A new genus and species of Erythroneurini from Huajiang, Guizhou, China, *Anuihuajiangia pyramidalis* **gen. et sp. nov.** are described and illustrated. The new genus is characterized by subgenital plate extremely short, with long macrosetae dorsally at base, and small teeth-like setae at apex. The characteristic aedeagus shaped like two overlapping cones can also easily distinguish it from other genera. In general, this study further enriches the diversity of Erythroneurini in southwestern China.

Introduction

Erythroneurini Young, 1952 is the largest leafhopper tribe of Typhlocybinae (Young, 1952). The subfamily comprises 204 genera and ~2,000 described species (Dmitriev, 2003; Song et al., 2016; Song and Li, 2017), and is widely distributed in the six major zoogeographic regions of the world (Chen et al., 2020). They are important agricultural and forestry pests that feed on an extensive variety of plants, including cereal crops, vegetables, fruit trees and wild grasses, and they are also vectors of plant disease through a combination of herbivory and pathogen transmission (Morris, 1971; Guo, 2011; Roddee et al., 2018). Host plants for most species remain unknown, but species with known hosts appear to be highly host-specific (Jiang et al., 2005; Jarrell et al., 2020; Kim et al., 2021).

Guizhou is located at the eastern slope of the Yunnan-Guizhou Plateau in southwestern China, which is suitable for long-term inhabitation of leafhoppers in view of abundant rainfall, suitable temperature, and high vegetation coverage. A total of 28 genera and 113 species of

Erythroneurini have been recorded in Guizhou, accounting for 54% and 33% of the recorded genera and species in China by 2020 (Chen et al., 2020). However, many genera and species from this area remain to be described, thus there is an urgent need to collect and describe the diversity of leafhoppers. The objective of this work was to describe a new genus and species from southwestern China.

Material and methods

All leafhoppers were collected and preserved in absolute ethanol. Morphological terminology used in this work follows Dietrich (2005) and Song and Li (2013). Abdomens of specimens were removed and cleared in hot 10% NaOH, rinsed with water, and then stored in glycerin. Genital dissections were performed in glycerin to prevent pieces from drying out. The dissected male genitalia were observed and drawn using Olympus SZX16 and BX53 microscopes. Images of habitus were taken using a KEYENCE VHX-5000 digital microscope. Body length was measured from apex of vertex to tip of forewings. Multiple images were stacked to obtain focused pictures and edited in Adobe Photoshop CS6.

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All specimens examined are deposited in the collection of the School of Karst Science, Guizhou Normal University, China (GZNU).

Results

Anuihuajiang Zhang & Song gen. nov.

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Type species. *Anuihuajiang pyramidalis* Zhang & Song sp. nov.

Diagnosis. *Anuihuajiang* gen. nov. can be distinguished from other genera of Erythroniini by the following combination of characters: 1) fourth apical cell of forewing very small and triangular; 2) subgenital plate short and stubby, with several macrosetae in two groups, and peg-like setae on preapical projection; 3) connective M-shaped, with central lobe; 4) aedeagus with shaft short, slightly "S" sinuated; and 5) anal tube with segment X with paired basal processes and paired bifurcated ventroapical processes.

Description. Whole body greenish grey. Head, in dorsal view, roundly produced; narrower than pronotum; its medium length much shorter than width between eyes; with paired preapical dark spots. Pronotum nearly twice as long as vertex; almost transparent. Face broad; distinctly broadened at lower part; convex in profile. Forewing semitransparent; with four apical cells, 1st apical cell with angulate

base, 2nd apical cell subquadrate, 3rd apical cell widened distally, 4th apical cell very small, triangular.

Abdominal apodemes small, extended to 3rd sternite.

Male genitalia. Pygofer with lobe with posterodorsal margin bluntly angulate; with several macrosetae near middle of ventral margin; with distinct dorsal appendage movable, moderately long and tapered. Subgenital plate stubby; with narrow apex, abruptly subbase broadened; with macrosetae in two groups and peg-like setae on a preapical projection. Connective M-shaped; with central lobe broad, lateral arms long. Style with apical tooth longer than subapical one. Aedeagus without processes; shaft broadened, in ventral view; with enlarged dorsal apodeme in lateral view; gonopore at apex. Anal tube with segment X with paired basal processes and paired bifurcated ventroapical processes.

Distribution. China (Guizhou).

Etymology. The new genus name was formed by combining the prefix "Anu-" of the genus name "*Anufrievia*" and the type locality of its type species "Huajiang".

Anuihuajiang pyramidalis Zhang & Song sp. nov.

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Diagnosis: see generic diagnosis.

Measurements. Male, 2.9-3.1 mm; female 3.2-3.3 mm (including wing).

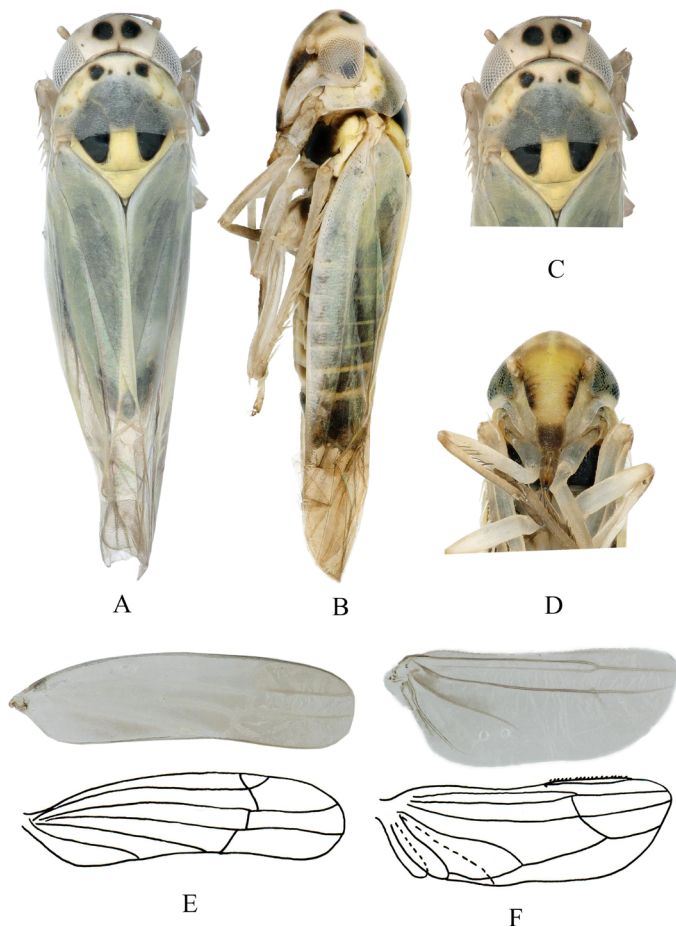


Figure 1 *Anuihuajiang pyramidalis* Zhang & Song gen. et sp. nov. A) Dorsal habitus B) Lateral habitus C) Head and thorax, dorsal view D) Face E) Forewing F) Hind wing.

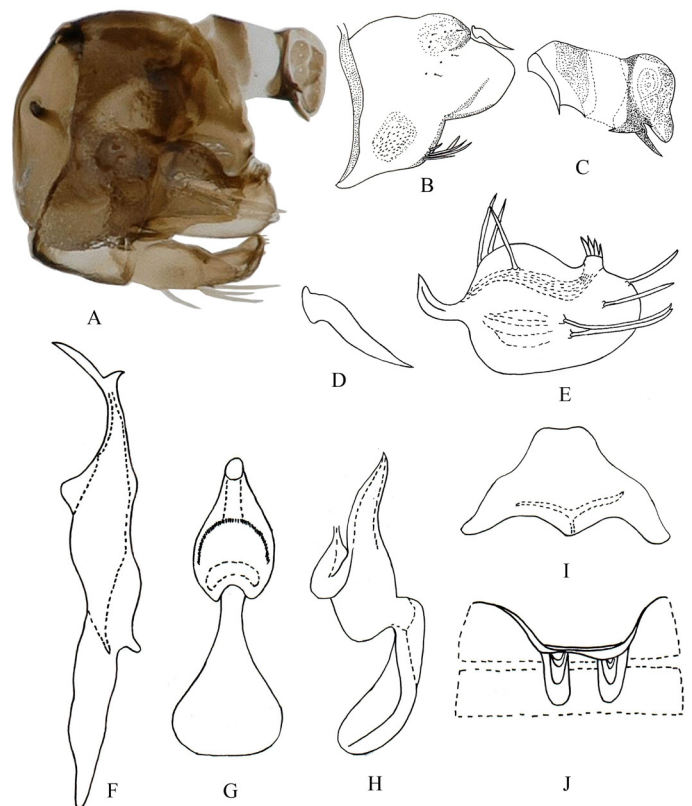


Figure 2 *Anuihuajiang pyramidalis* Zhang & Song gen. et sp. nov., male A) Genital capsule, lateral view B) Pygofer lobe, lateral view C) Anal tube with appendages, lateral view D) Dorsal pygofer process, lateral view E) Subgenital plate, lateral view F) Style, ventral view G) Aedeagus, ventral view H) Aedeagus, lateral view I) Connective, dorsal view J) Abdominal apodemes.

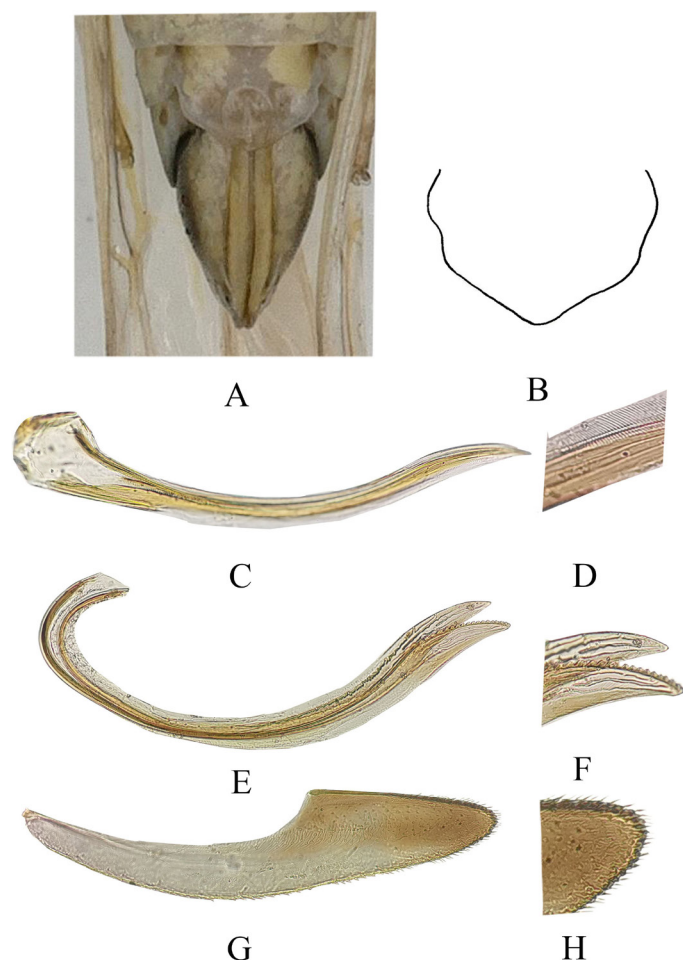


Figure 3 *Anuihuajianga pyramidalis* Zhang & Song **gen. et sp. nov.**, female A) Terminalia, ventral view B) Sternite VII, ventral view C) Valvula I, lateral view D) Close up of dorsal sculpturing of valvula I E) Valvulae II, lateral view F) Close up of apex of valvulae II G) Valvula III, lateral view H) Close up of apex of valvula III.

Coloration. Vertex milky yellow, with pair of dark spots preapically; coronal suture short (Fig. 1A). Eyes greyish black (Fig. 1A). Face with frontoclypeus with both sides black, middle part yellow, anteclypeus black (Figs 1B, 1D). Pronotum grey; with pair of big black spots near anterior margin and pair of small black spots at inner sides of big black spots (Figs. 1A, 1C). Scutellum yellow, basal triangles black, transverse impression obvious (Fig. 1C). Forewing and hind wing semitransparent (Figs. 1E, 1F).

Male terminalia. Abdominal apodemes small, extended to hind margin of 3rd sternite (Fig. 2J). Pygofer lobe with dorsal appendage falcate (Figs. 2A, 2B, 2D). Anal tube segment X with paired ventroapical process (Figs. 2A, 2C). Subgenital plate with four macrosetae on outer surface; with region near base distinctly expanded and three moderately long macrosetae on dorsal margin; and four preapical peg-like setae on dorsal surface (Figs. 2A, 2E). Connective M-shaped (Fig. 2I). Aedeagus with shaft short; preatrium long (Figs. 2G, 2H). Style with two apical points (Fig. 2F).

Female genitalia. Seventh sternite broad, in ventral view (Figs. 3A, 3B). Valvula I elongate; curved dorsally and evenly tapered from base to apex; finely strigate along dorsal margin of apex (Figs. 3C, 3D). Valvula II asymmetrical; tooth-like protrusions on right blade (Figs. 3E, 3F). Valvula III tapered distally; apex rounded, with bushy microtrichae at apex (Figs. 3G, 3H).

Material examined. Holotype: ♂ CHINA, Guizhou Prov., Huajiang, 21 IX 2019, coll. Zhouwei Yuan and Xiao Yang. Paratypes: 10 ♂♂, 17 ♀♀, same data as holotype.

Etymology. The name of the new species is a reference to the Latin word “pyramidalis” for the aedeagus shaped as overlapping cones.

Discussion

The new genus is similar to *Anufrievia* Dworakowska, 1970 in body shape, stubby subgenital plate, pygofer with group of macrosetae at ventrobasal angle and posterior margin truncate. However, it can be distinguished from the latter by the following characteristics: anal tube with paired basal and apical appendages; aedeagal shaft short, slightly “S” shaped, without atrial process; and connective with central lobe. This new genus is also somewhat similar to *Arboridia* Zachvatkin, 1946 in body shape and color pattern, especially with paired dark preapical spots on vertex, but differs in having the connective central lobe large, both dorsal pygofer and anal tube appendages present, and subgenital plate extremely short with a group of macrosetae at ventrobasal angle.

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Conflicts of interest

The authors declare no conflicts of interest.

Author contribution statement

NZ carried out the field work, including the collection of specimens, YHS carried out the taxonomic work, dissections, QFS carried out the preparation of photographs and plates, NZ wrote the initial manuscript, YHS participated in the corrections and final redaction.

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