



Systematics, Morphology and Biogeography

Description of a second species of *Angucephala* DeLong & Freytag (Hemiptera: Cicadellidae: Iassinae: Gyponini)



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ABSTRACT

A second species of *Angucephala* DeLong & Freytag, 1975 is described and illustrated from Ecuador, *A. freytagi* sp. nov. (Napo Province). This species can be distinguished from the type species (*A. mellana* DeLong & Freytag, 1975) mainly by features of the male pygofer and styles. A redescription of the genus and illustrations of the type species are also provided.

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Introduction

Gyponini is the largest tribe of the leafhopper subfamily Iassinae, comprising 1369 valid species in 60 genera (C. Gonçalves, unpublished data), all restricted to the Americas. Approximately 21% of genera in the tribe are monotypic, but study of hundreds of recently collected specimens from South America has uncovered a large number of undescribed species, including many species of previously monotypic genera. These species have been described in recent papers, where redescrptions and new diagnoses of these genera are provided (e.g., Gonçalves et al., 2013, 2014; Domahovski et al., 2014).

Angucephala DeLong & Freytag is another monotypic Neotropical genus, which includes *A. mellana* DeLong & Freytag, and is described based on two male and four female specimens from Honduras, Colombia, and Venezuela (DeLong & Freytag, 1975). According to the authors, *Angucephala* is similar to *Chloronana* DeLong & Freytag in overall size and colouration and to *Prairiana* Ball in the male genitalia. In this paper, *A. freytagi* sp. nov. is described from Napo (Ecuador) and illustrations of the type species of *Angucephala* are provided for comparison. Additionally, a new diagnosis and redescription of the genus are provided.

Material and methods

For the analysis of the genital structures, the abdomen was removed and placed in hot 10% KOH, following Oman (1949). Terminalia were washed for 5–10 min in hot water, placed on a concave slide with glycerin for examination and preparation of photographs, and stored in a small vial with glycerin pinned below the specimen. Photographs were taken with a digital camera attached to Leica and Olympus stereomicroscopes and combined with the image stacking software *CombineZP*. Morphological terminology follows mainly Dietrich (2005), except for the head sclerites (Hamilton, 1981; Mejdalani, 1998) and leg chaetotaxy (Rakitov, 1997). The holotype of the new species is deposited at Escuela Politécnica Nacional, Quito (EPCN) and additional comparative material is deposited at American Museum of Natural History, New York (AMNH).

Taxonomy

Angucephala DeLong & Freytag, 1975

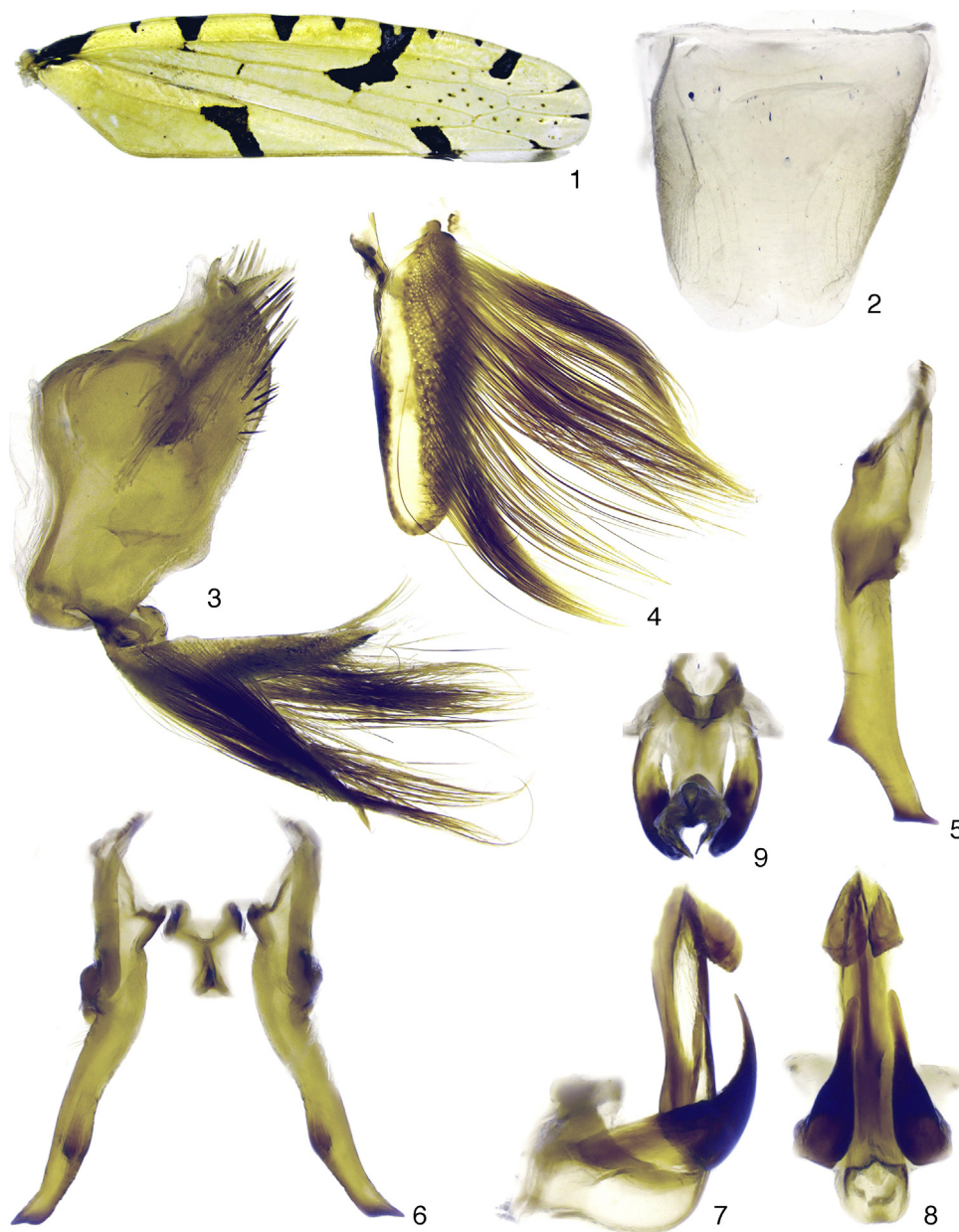
Figs. 1–23

Angucephala DeLong & Freytag, 1975: 111, Figs. 5–9. Type species: *Angucephala mellana* DeLong & Freytag, 1975, by original designation and monotypy.

Diagnosis: Body (Figs. 18, 19, 21, 22) slightly flattened dorsoventrally; transition crown-face (Figs. 19, 22) distinct, thick; antennal ledges (Figs. 20, 23), in frontal view, carinate and oblique;

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Figs. 1–9. *Angucephala freytagi* sp. nov., male holotype. 1. Right forewing. 2. Sternite VIII, ventral view. 3. Pygofer, anal tube, valve, and subgenital plate, lateral view. 4. Right subgenital plate, ventral view. 5. Right style, lateral view. 6. Connective and styles, dorsal view. 7. Aedeagus, lateral view. 8. Aedeagus, caudal view. 9. Aedeagus, dorsal view.

forewings (Figs. 1, 10) without extra crossveins; hind legs with femoral setal formula 2-2-1; male sternite VIII (Figs. 2, 11) slightly longer than wide; pygofer lobes (Figs. 3, 12) longer than high; with pair of short finger-like inner dorsal basal processes; subgenital plates (Figs. 3, 4, 12, 13) ligulate, ventral surface near outer margin covered by very long hair-like setae; connective (Figs. 6, 15) Y-shaped; styles (Figs. 5, 6, 14, 15) with a sharp tooth projecting ventrally on apical third; aedeagus (Figs. 7–9, 16, 17) atrium with pair of falciform processes, not extending to apex of shaft; apex of shaft with a pair of lateral lobed processes directed ventrally.

Redescription: Males: total length 12.5–13.2 mm; female: 13.0 mm. Body (Figs. 18, 19, 21, 22) slightly flattened dorsoventrally, in dorsal view with forewings fusiform.

Crown (Figs. 18, 21) moderately produced, median length approximately two-thirds of interocular distance, narrower than pronotum; transocular width approximately two-thirds of maximum pronotum width; anterior margin broadly rounded or slightly

trilobed; slightly depressed laterally; surface with oblique lateral striae between ocellus and adjacent compound eye, and longitudinal striae between ocelli. Ocelli large, closer to posterior than anterior margin and closer to midline than adjacent compound eye. Coronal suture distinct at posterior half of crown. Transition crown-face (Figs. 19, 22) distinct, thick, not foliaceous, with three transverse carinae. Frons (Figs. 20, 23) moderately inflated; lateral margins slightly arched. Frontogenal sutures surpassing antennal ledges and reaching anterior margin of crown. Antennal ledges, in frontal view, carinate and oblique. Epistomal suture indistinct. Clypeus (Figs. 20, 23) slightly inflated; lateral margins approximately parallel. Genae with lateral margins below compound eye slightly convex.

Pronotum (Figs. 18, 21) with anterior margin broadly rounded; posterior margin concave mesally; surface with transverse striae distributed on posterior two-thirds and small punctures scattered at disc; in lateral view (Figs. 19, 22), slightly declivous.



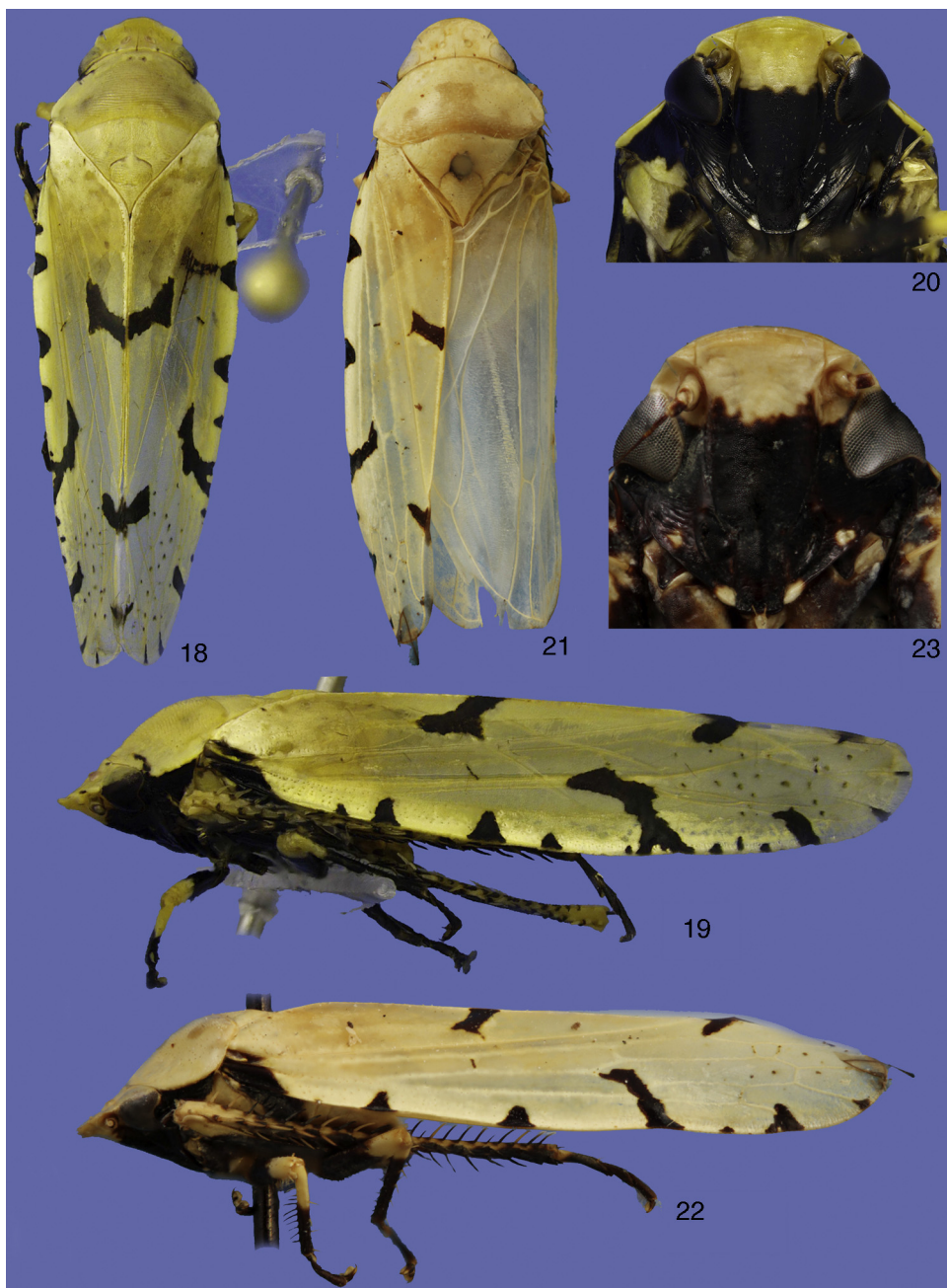
Figs. 10–17. *Angucephala mellana* DeLong & Freytag, 1975, male holotype. **10.** Right forewing. **11.** Sternite VIII, ventral view. **12.** Pygofer, valve, and subgenital plate, lateral view. **13.** Right subgenital plate, ventral view. **14.** Right style, lateral view. **15.** Connective and style, dorsal view. **16.** Aedeagus, lateral view. **17.** Aedeagus, caudal view.

Scutellum (Figs. 18, 21) slightly inflated, surface transversally striated. Forewings (Figs. 1, 10) with R_1 present, and with three closed anteapical cells, without extra crossveins; crossveins m-cu2 posterior to bifurcation of M; appendix present and narrow. Foreleg femora with AD, AM, and PD rows reduced and poorly defined, with exception of apical setae AD_1 , AM_1 and PD_1 ; AV and PV rows formed by few and sparse setae, AV row restricted to proximal half and PD row restricted to distal half of femur; IC row formed by slightly arched comb of fine setae, beginning at distal half of femur and extending to AM_1 ; tibiae without intercalary row. Hind legs with femoral setal formula 2-2-1, tibial PD row with approximately twice as many cucullate setae as AD; AD without intercalary setae; basal tarsomere as long as combined length of two distal tarsomeres.

Male sternite VIII (Figs. 2, 11) slightly longer than wide; lateral margins converging posteriorly; posterior margin broadly rounded or mesally emarginate. Pygofer lobes (Figs. 3, 12) longer than high; with pair of short finger-like inner dorsal basal processes; surface with macrosetae at apical third and hair-like setae at median third; ventral margin angulate or with conspicuous rounded lobe

at basal half. Subgenital plates (Figs. 3, 4, 12, 13) shorter than pygofer; ligulate; approximately three times longer than maximum width; ventral surface near outer margin covered by very long hair-like setae. Connective (Figs. 6, 15) Y-shaped; dorsal keel present; articulated with aedeagus. Styles (Figs. 5, 6, 14, 15) elongated; in lateral view, with a sharp tooth projecting ventrally on apical third. Aedeagus (Figs. 7–9, 16, 17) with dorsal apodemes very short; shaft elongated; curved dorsally at base and then tubular and straight; atrium with pair of falciform processes, not extending to apex of shaft; apex of shaft with a pair of lateral lobed processes directed ventrally.

Colour: Body (Figs. 18, 19, 21, 22) with ground colour pale yellow and venter of thorax mostly black. Crown, pronotum and mesonotum yellow, unmarked. Face (Figs. 20, 23) with pale yellow dorsal third and black ventral two-thirds; with pair of spots on dorsal angle of lora and middle of genae, pale yellow; another pair of bright white spots at apex of maxillary plates. Forewings (Figs. 1, 10) yellow; eight to ten, usually subtriangular, black maculae along costal margin, the one over R_1 more elongated than others, extending to bifurcation of M; veins delimiting apical cells with



Figs. 18–23. *Angucephala freytagi* sp. nov., male holotype. 18. Habitus dorsal. 19. Habitus lateral. 20. Head, frontal view. *Angucephala mellana* DeLong & Freytag, 1975, male holotype. 21. Habitus dorsal. 22. Habitus lateral. 23. Head, frontal view.

black apices; two transcommissural oblique black stripes, longer one at midlength of clavus and smaller one at apex of clavus; several very small black spots on anteapical and apical cells. Hind wings greyish-white. Legs mostly black, with yellow apices of femora and bases of tibiae.

Distribution: Colombia (Cauca Department); Ecuador (Napo Province); Honduras; and Venezuela (Carabobo State).

Notes: According to DeLong & Freytag (1975), *Angucephala* resembles *Chloronana* in overall size and colour, but differs in not being strongly flattened dorsoventrally (Figs. 19, 22), head not strongly produced anteriorly (Figs. 18, 21), forewings without supernumerary crossveins, and having the genital structures similar to *Prairiana*. However, several other genera of Gyponini share these characteristics. Until a formal phylogenetic analysis is

conducted, the relationship of *Angucephala* to other genera remains unknown. Nevertheless, *Angucephala* can be distinguished from other genera by the diagnostic characteristics given above.

***Angucephala freytagi* sp. nov.**
(Figs. 1–9, 18–20)

Diagnosis: Male sternite VIII (Fig. 2) posterior margin mesally emarginate; pygofer (Fig. 3) with ventrobasal lobe and apex broadly rounded; styles (Fig. 5), in lateral view, with apex foot-like, with dorsal pointed toe and angled ventral heel; aedeagal shaft (Fig. 7), in lateral view, broad.

Description: Male: total length 13.2 mm.

Male terminalia: Sternite VIII (Fig. 2) posterior margin with a median emargination, forming two small lobes. Pygofer lobes

(Fig. 3) with ventral margin with a conspicuous rounded lobe at basal half; inner surface with finger-shaped process arising dorsally, near base of anal tube, extending ventrally; pygofer apex broadly rounded. Valve laterally fused to pygofer, approximately three times wider than long; posterior margin with a slight median reentrance. Subgenital plates (Figs. 3, 4) less sclerotized medially; apex rounded, without setae. Connective (Fig. 6) about one-fourth of the length of style apophysis. Styles (Figs. 5, 6) elongate; with tuft of setae at median third of outer lateral margin; preapical portion, after ventral tooth, short, apex, in lateral view, foot-like, with dorsal pointed toe and angled ventral heel. Aedeagus (Figs. 7–9) with shaft, in lateral view, broad; apical lobed processes subquadrate with ventral margin serrated.

Female: unknown.

Etymology: This species is named after Dr. Paul H. Freytag (Entomology Department, University of Kentucky) in recognition of his great contributions to leafhopper taxonomy.

Holotype: **ECUADOR:** Napo: Yanayacu Biological Station, 5 km SW Cosanga, 2100 mslm, Jan 19 2009, S0°35.967' W78°53.419', Hg vapor light, Geert Goemans, DNA voucher DZRJ ENT 2420, male (EPCN).

Notes: *Angucephala freytagi* **sp. nov.** is very similar to *A. mellana*. However, the new species may be differentiated from the latter by the following characteristics: (1) posterior margin of male sternite VIII with a median emargination (Fig. 2), in *A. mellana* the posterior margin is broadly rounded (Fig. 11); (2) male pygofer, in lateral view, slightly narrowed at apical third and apex broadly rounded (Fig. 3), in *A. mellana* the apical third is narrowed and apex is acute (Fig. 12); (3) style with apical portion short and apex foot-shaped (Figs. 5, 6), in *A. mellana* the apical portion is long and apex pointed (Figs. 14, 15); and (4) shaft of aedeagus, in lateral view, broad (Fig. 7), in *A. mellana* narrow (Fig. 16).

Additional material studied

Angucephala mellana DeLong & Freytag (Figs. 10–17, 21–23): **HONDURAS:** 1940, W. VonRagen, male holotype (AMNH).

Conflict of interest

The authors declare no conflicts of interest.

Acknowledgements

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