

New erythroneurine leafhopper species from the Australian realm (Hemiptera: Cicadellidae: Typhlocybinae)

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Abstract

Generic characteristics of three Australian erythroneurine genera are revised based on three new species: *Baya lata*, *Zinga longa* and *Pettya tenuis* **sp. nov.** Male genitalia characteristics of genus *Pettya* Kirkaldy are described for the first time.

Key words: Auchenorrhyncha, taxonomy, morphology, Papua New Guinea, Australia

Introduction

The leafhopper tribe Erythroneurini is a highly diverse group comprising nearly 200 genera and more than 2,000 species distributed worldwide. However, only ten genera and about thirty-three species were reported previously from the Australian realm. In this study, we describe three new species collected from this realm belonging to the genera *Baya* Dworakowska, 1972, *Zinga* Dworakowska, 1972 and *Pettya* Kirkaldy, 1906. In the original description and subsequent studies of *Pettya* (Kirkaldy, 1906; Evans, 1966), only external characters were described. In this paper, a detailed diagnosis and illustrations of this genus, including the male genitalia, are provided. *Baya* and *Zinga* were established by Dworakowska (1972) as two closely related genera. One of the differences between these two genera indicated by Dworakowska is that *Zinga* has fused aedeagal processes (Dworakowska, 1972). However, we found that the aedeagal processes are well separated in the new species *Zinga longa* **sp. nov.** Therefore, we provide new diagnostic characters for distinguishing *Zinga* from *Baya*.

Material and methods

Research method are as described by Cao *et al.*, 2013. Specimens examined are deposited in the Bohart Entomological Museum, University of California, Davis (UCD), and the Illinois Natural History Survey, Champaign, USA (INHS).

Baya Dworakowska, 1972

Baya Dworakowska, 1972: 401. Type species: *Baya dymczata* Dworakowska, 1972

Description. Body large and slim. Crown fore margin subparallel to hind margin, head narrower than or as wide as pronotum. Face convex in profile, anteclypeus broad. Ocelli vestigial, represented by pair of indistinct pits mesad of

dorsal end of lateral frontal sutures; dorsal margin of face with pair of large, pale translucent areas. Forewing with first and third apical cell broad, second apical cell narrowest, fourth apical cell almost as long as third. Hind wing venation similar to that of *Elbelus* Mahmood, submarginal vein reduced, terminated at the connection with CuA, CuA'' absent, RA vein present.

Anal tube sclerotized, without appendage.

Pygofer well sclerotized, caudal margin very short, ventral margin oblique and with short lamellate processes or protrusions from both outer and inner sides; setosity poorly developed. Subgenital plate surpassing hind margin of pygofer side, outer margin slightly widened subbasally then gradually narrowing towards apex, apical part pigmented, with 1–2 macrosetae near inner basal angle, with or without macrosetae near central outer margin, marginal microsetae reduced, with some microsetae scattered on ventral side. Style with apical part slender, bent in right angle, preapical lobe small. Connective U-shaped, manubrium short but very broad. Aedeagus almost horizontal, shaft provided with very wide lateral lamella which extended ventrad, with pair of well-developed branched apical processes; dorsal apodeme narrow and long in lateral view; preatrium very short; gonopore central or subapical on ventral side.

Diagnosis. This genus is similar to *Zinga* Dworakowska, but the forewing has a brown longitudinal stripe, the hind wing has a reduced submarginal vein and lacks CuA'', the subgenital plate has 1–2 macrosetae near the inner basal angle and the aedeagal shaft has a pair of wide lateral lamellas. Both genera also have a pair of large, pale translucent areas on the anterior margin of the head at the transition between crown and face.

Distribution. Papua New Guinea.

Baya lata sp. nov.

(Figs 1, 4a–e)

Description. Ground color (Figs 4a–e) beige, eyes grey, lower midline of frontoclypeal area and anteclypeus infuscated, basal triangles of mesonotum dark, forewing with brown longitudinal stripe near outer margin. Pronotum with reticulate sculpture. Head narrower than pronotum, coronal suture distinct; anteclypeus much wider than in type species. Brown stripe on forewing lightened apically.

Pygofer side (Fig. 1a) with 2 distinct processes and 2 small protrusions on lower margin, upper process extended from outer surface, lower process on inner edge, larger than upper one, 2 lowest protrusions very close to each other. Subgenital plate (Figs 1a, b) with 2 macrosetae in central part, near outer margin, base of plate with two enlarged macrosetae, with more microsetae on ventral side but marginal microsetae greatly reduced. Style (Fig. 1c) with apical part thickened and slightly serrated subapically, preapical lobe small, near midlength. Connective (Fig. 1d) without central lobe. Aedeagal shaft (Figs 1e, f) with lateral lamella broad, rectangular, with paired processes extended from lower apical angle, process 3-branched, antler-like; dorsal apodeme long; gonopore near shaft midlength.

Diagnosis. The new species can be easily distinguished from the type species by the presence of marginal macrosetae in the central part of the subgenital plate and the 3-branched apical processes of the aedeagal shaft. The pygofer lobe of the new species is also longer and the style is thicker apically.

Measurement. Male length 4.6mm.

Material examined. Holotype ♂, PAPUA NEW GUINEA, Morobe, Tekadu, 7°38'S, 146°34'E, 01–20 iv 2000, Malaise trap, coll. T. Sears & Binatung Brigade (UCD).

Etymology. The new specific epithet is derived from the Latin adjective “*latus*” which means “broad”, referring to the broad lateral lamella of the aedeagal shaft.

Zinga Dworakowska, 1972

Zinga Dworakowska, 1972: 398. Type species: *Zinga novembris* Dworakowska, 1972

Description. Body size, shape and coloration similar to those of *Baya* Dworakowska, but face lighter, coronal suture indistinct, and without dark stripe on forewing. Ocelli vestigial, represented by pair of indistinct pits mesad of dorsal end of lateral frontal sutures; dorsal margin of face with pair of large, pale translucent areas. Pronotum with

reticulate pattern as in *Baya*. Forewing venation as in *Baya*, hind wing venation usual for Erythroneurini, RA vein present.

Male 2S abdominal apodemes narrow, extended to sternite IV–V. Anal tube without appendages.

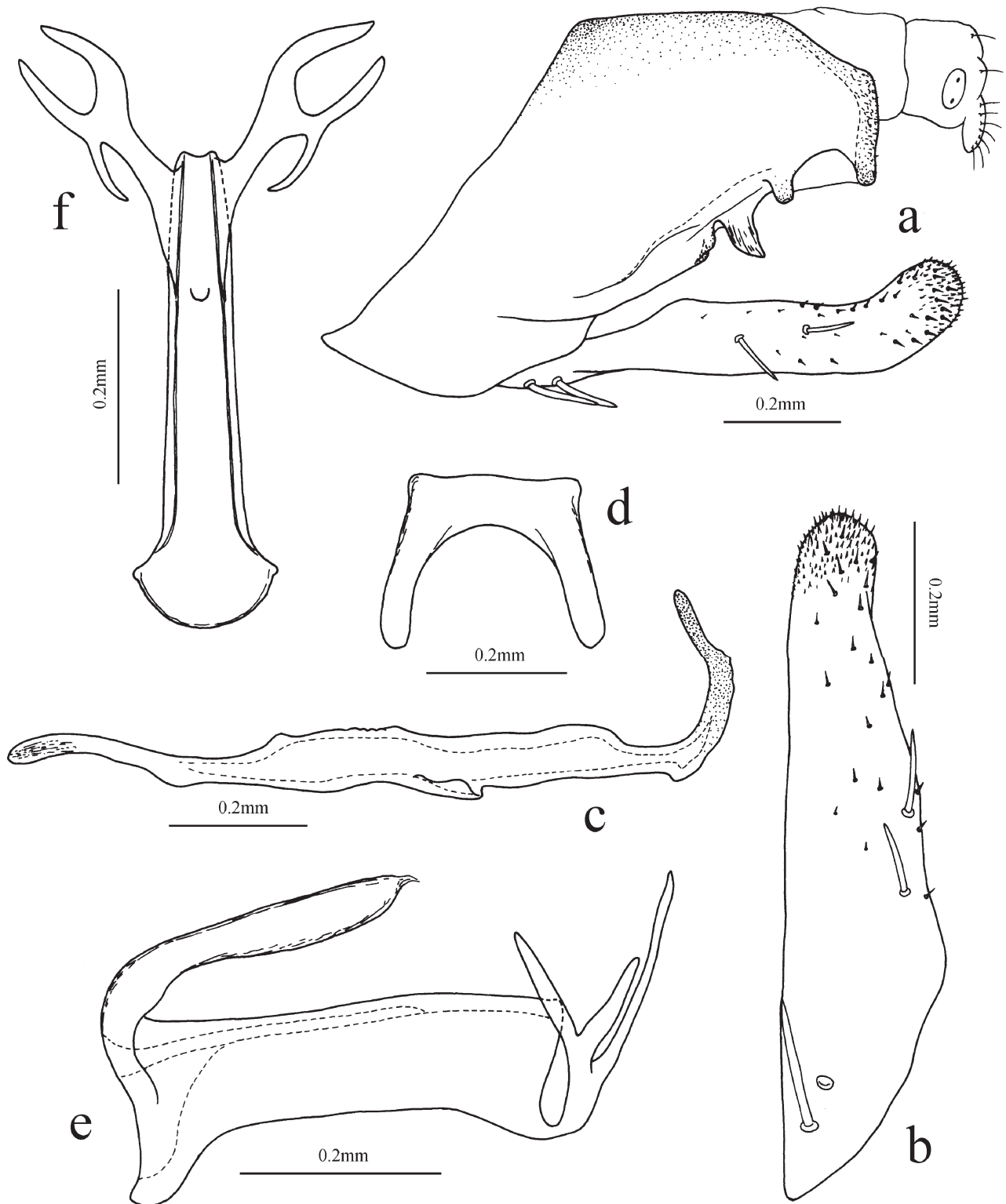


FIGURE 1. *Baya lata* sp. nov. a. genital capsule; b. subgenital plate, ventral view; c. style, lateral view; d. connective; e. aedeagus, lateral view; f. aedeagus, ventral view.

Pygofer side with two pigmented processes on dorso-caudal and ventro-caudal angles, arising from either outer or inner lobe, usually slim, hind margin membranous. Subgenital plate surpassing hind margin of pygofer side, base fused with sternite IX, widened subbasally, with about 2–4 small macrosetae near central outer margin, microsetae

in row along outer margin and scattered on ventral side. Style slim, pointed apically, forming an angle subapically. Connective lamellate or U-shaped, manubrium short but broad, central lobe small to large. Aedeagal shaft tubular, apex with pair of lateral branches, each one bearing slim process, merged with each other subapically or not; dorsal apodeme narrow and long in lateral view, slightly expanded in caudal view; preatrium rudimentary to short; gonopore subapical on ventral side.

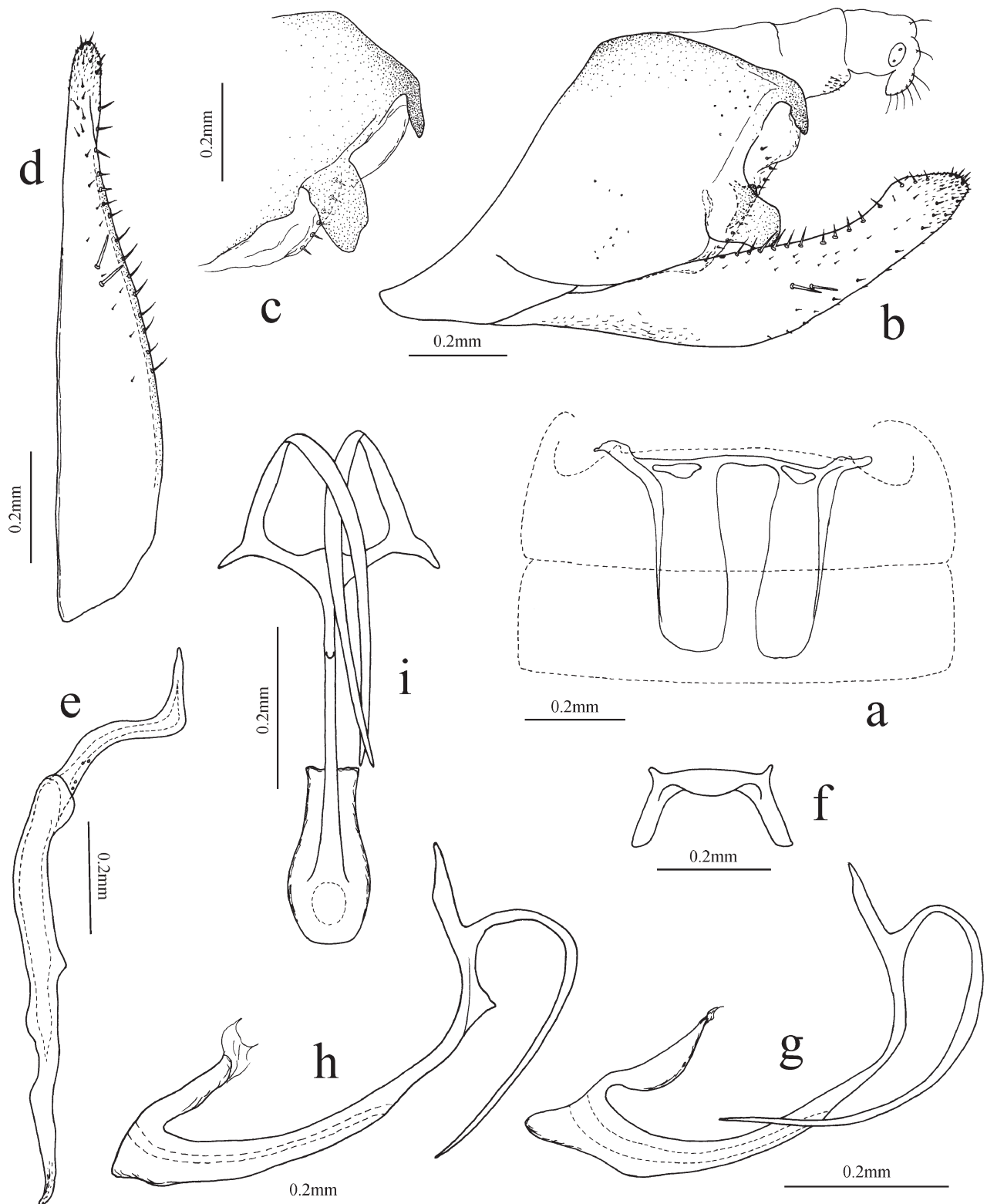


FIGURE 2. *Zinga longa* sp. nov. a. 2S abdominal apodemes; b. genital capsule; c. distal pygofer lobe of paratype; d. subgenital plate, ventral view; e. style, lateral view; f. connective, g. aedeagus of holotype, lateral view; h. aedeagus of paratype, lateral view; i. aedeagus, ventral view.

Diagnosis. In the original description of this genus, a significant character is the merged apical processes of the aedeagal shaft which form a closed ring. This condition also exists in *Z. mayensis* Dworakowska, 2011, but the area of distal fusion of the processes is much shorter than in the type species. The new species described here has the aedeagal processes free distally and is otherwise very similar to the two previously described species of *Zinga*. Therefore, the distal fusion of the aedeagal processes does not consistently distinguish this genus from *Baya* Dworakowska. More stable differences between these two genera are listed in the diagnosis of *Baya*.

Distribution. Australia; Papua New Guinea.

Zinga longa sp. nov.

(Figs 2, 4f–o)

Description. Overall color pale grey, eyes grey; basal triangles of mesonotum dark; specimens from Australia (Figs 4k–o) with vertex, face except gena and fore margin of pronotum yellow, tip of anteclypeus brown; specimen from Papua New Guinea without such markings (Figs 4f–j); forewing infuscated on outer margin apically.

Male 2S abdominal apodemes (Fig. 2a) not reached hind margin of sternite IV.

Pygofer side (Figs 2b, c) with two distal processes formed from outer surface, upper one finger-like, well pigmented, lower one lamellate, broad. Subgenital plate (Figs 2b, d) pigmented apically, narrow distally in ventral view, with about 2–4 macrosetae, marginal microsetae not differentiated in size. Style (Fig. 2e) widened subapically. Connective (Fig. 2f) U-shaped, lateral arms slender, central lobe rounded, very short. Aedeagus (Figs 2g–i) with very long apical processes, not fused to each other.

Diagnosis. The new species can be distinguished from the other species by the wider, lamellate lower process of the pygofer side, rounded connective central lobe and the longer, separated apical processes of the aedeagal shaft.

Notes. The paratype specimens from Australia are larger than the holotype from Papua New Guinea, and have the pygofer lower process slightly longer (Fig. 2c), and the aedeagal processes shorter (Fig. 2h). The transition from vertex to face has the paired white (translucent) areas more distinct in the paratypes (Fig. 4o) than in holotype (Fig. 4j). We consider this variation to be intraspecific.

Measurement. Male length of specimen from Papua New Guinea 4.85mm; those from Australia 5.40–5.65mm.

Material examined. Holotype ♂, PAPUA NEW GUINEA, Gulf, Ivimka Res. Station, Lakekamu Basin, 120m, 7°44'S, 146°30'E, 01–05 iii 2000, Malaise trap, coll. T. Sears (UCD). Paratypes: 1 ♂, AUSTRALIA: QLD ca. Malanda, Rose Gum Retreat, 17.3114°S, 145.6998°E, 750m, 24 ii 2015, coll. CH Dietrich, Hg vapor light in 2°, rainforest, AU15-18-1 (INHS); 2 ♂, same data as holotype except 26 ii 2015, AU15-18-4 (INHS).

Etymology. The new specific epithet is derived from the Latin adjective “*longus*” which means “long”, referring to the long apical processes of the aedeagal shaft.

Pettya Kirkaldy, 1906

Pettya Kirkaldy, 1906: 343; Evans, 1966: 272. Type species: *Pettya anemolua* Kirkaldy, 1906
Eutambourina Evans, 1942: 27

Description. Body large and robust, upper part of face, pronotum and scutum distinctly punctate, but pits much sparser than those in *Musbrnoia* Dworakowska, 1972 and *Variolosa* Cao & Zhang, 2013. Head broad, as wide as or slightly narrower than pronotum, crown fore margin subparallel to hind margin. Ocelli consisting of elongated, crescent-shaped vestiges continuous with lateral frontal sutures. Face strongly convex in profile, anteclypeus ovoid, lorum large. Forewing with first and third apical cell broad, second apical cell narrowest, fourth apical cell almost as long as third, AA and AP present. Hind wing venation usual for Erythroneurini, RA vein present.

Abdomen with numerous pits, 2S abdominal apodemes very small in examined species. Without anal tube appendage.

Pygofer well sclerotized, with some rounded membranous areas of different sizes, setosity rudimentary; without dorsal and ventral appendages. Subgenital plate surpassing hind margin of pygofer side, base fused with sternite IX, broadened subbasally and narrowing towards apex, with about 2 macrosetae subbasally near outer margin, with

some rigid setae on distal half of ventral side, without marginal microsetae. Style with apical part club-like, basal part elongated, preapical lobe shifted apically, well protruded. Connective U-shaped, manubrium short but broad, central lobe absent. Aedeagal shaft tubular, usually with asymmetric processes; preatrium short.

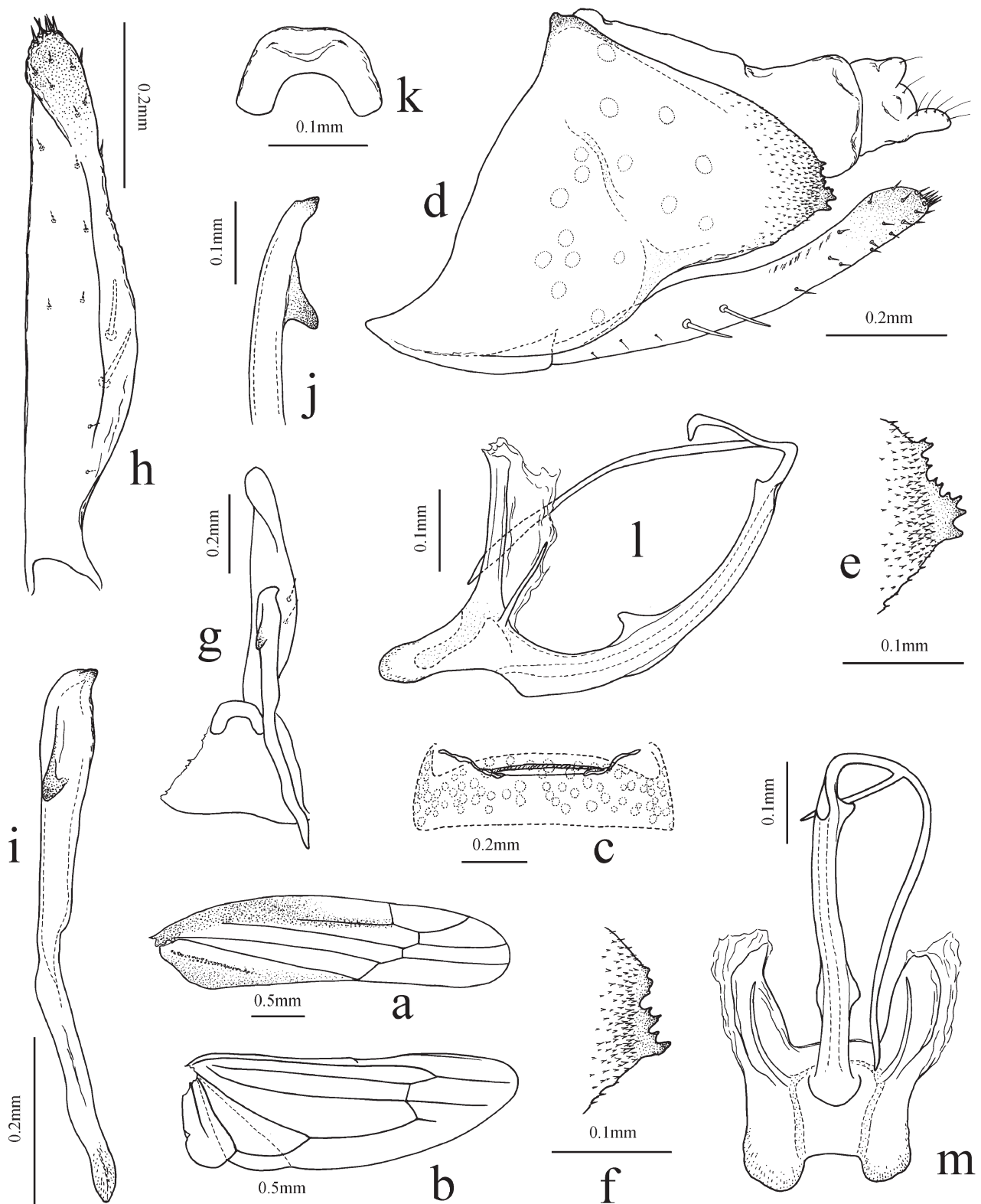


FIGURE 3. *Pettya tenuis* sp. nov. a. forewing; b. hind wing; c. 2S abdominal apodemes; d. genital capsule; e. f. apex of pygofer side; g. subgenital plate, style, connective and the 9th sternite; h. subgenital plate, dorsal view; i. style, dorsal view; j. apex of style; lateral view; k. connective; l. aedeagus, lateral view; m. aedeagus, caudal view.

Diagnosis. Male genitalia characters were described based on the new species and the drawing of the genital capsule of *P. punctata* (Evans, 1942). The male genitalia of the type species and the other previously included species, *P. taedei* (Kirkaldy, 1906), have not been studied. This genus is similar to *Eldama* Dworakowska, 1972 externally, but the pits on pronotum are larger and sparser, the subgenital plate is not pointed apically and has macrosetae subbasally, and the preapical lobe of the style is much larger.

Distribution. Australia.

***Pettya tenuis* sp. nov.**

(Figs 3, 4p–t)

Description. Ground color (Figs 4p–t) yellowish-beige, eyes grey. Vertex with pair of black patches near coronal suture; anteclypeus infuscated centrally. Pronotum with pair of oblique brown stripes near midline, continuous anteriorly with patches on vertex and posteriorly with brown basal triangles of mesonotum. Forewing with light brown stripes along inner margin and near outer margin, paler apically.

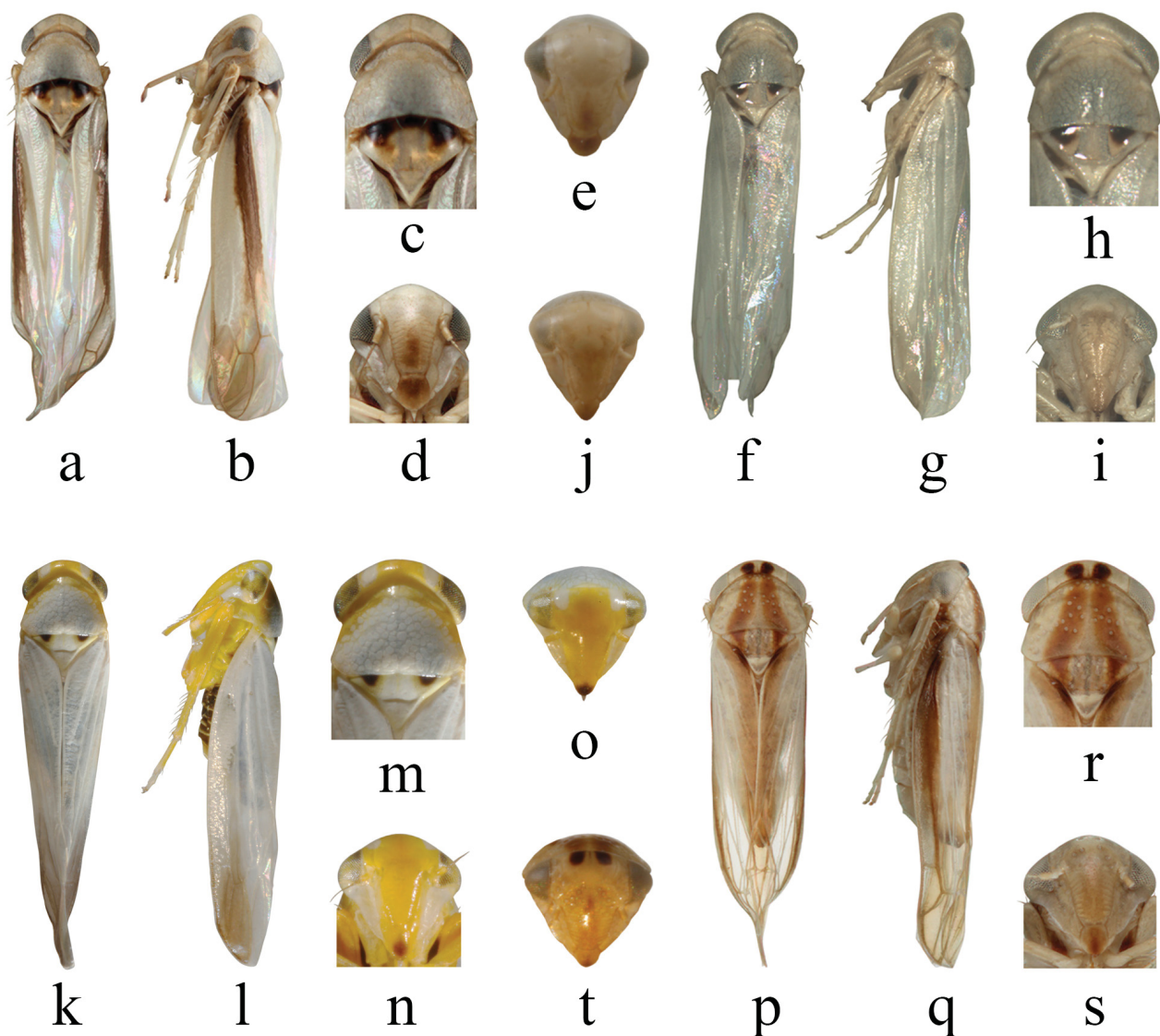


FIGURE 4. a–e. *Baya lata* sp. nov.; f–j. *Zinga longa* sp. nov., specimen from Papua New Guinea; k–o. *Zinga longa* sp. nov., specimen from Australia; p–t. *Pettya tenuis* sp. nov.

Pygofer lobe (Fig. 3d) narrowing apically, distal angle (Figs 3e, f) pigmented and serrated. Subgenital plate (Figs 3d, h) constricted near base, macrosetae small, with dense microsetae distally. Apical part of style (Figs 3i, j)

thicker than basal part, apex slightly pointed, preapical lobe fin-like in lateral view. Connective (Fig. 3k) with lateral arms thick. Aedeagal shaft (Figs 3l, m) asymmetrical, slightly twisted, curved dorsad, apical process bifurcated into two branches of different length, with small triangular dorsal distal lobe twisted to right side of gonopore, and two lamellate processes subbasally, with pair of slim processes on manubrium; manubrium very broad in caudal view, dorsal apodeme deeply concaved and preatrium shallowly concaved; gonopore subapically on ventral side, somewhat twisted to left.

Diagnosis. The new species can be distinguished from other species by the presence of two stripes on the pronotum. The male genitalia are similar to those of *P. punctata*, but the pygofer side is shorter and serrated distally, the aedeagal shaft is curved dorsad and provided with much shorter subbasal processes and a pair of slim processes on the manubrium.

Measurement. Male length 4.50–4.60mm.

Material examined. Holotype ♂, AUSTRALIA, Qld. Brisbane Forest Park, 07–27 xii 1995, coll. M.E. Irwin (INHS). Paratype: 1♂, same data as holotype (INHS).

Etymology. The new specific epithet is derived from the Latin adjective “*tenuis*” which means “thin, slender”, referring to the paired slim processes on the aedeagal manubrium.

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