

Two new genera of Pacific Paraboloponina leafhoppers (Hemiptera: Cicadellidae: Drabescini) with description of three new species

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Abstract

Two new genera, *Malaysiapona* gen. nov. and *Chandrapona* gen. nov. of Paraboloponina leafhoppers (Cicadellidae: Deltocephalinae: Drabescini) with their unusually developed aedeagal base are described from the Pacific (Malaysia). The following new species are also described with the new genera: *Malaysiapona brevipennis* sp. nov. from Sabah, *M. filamenta* sp. nov., from Sarawak and *Chandrapona vespertilis* sp. nov. from Sabah.

Key words: Auchenorrhyncha, Selenocephalinae, Paraboloponini, taxonomy

Introduction

Paraboloponina (Cicadellidae: Deltocephalinae: Drabescini) is a moderately large group of arboreal leafhoppers found throughout Asia and the Pacific and also a few taxa in Africa. Since revisional work on the group by Webb (1981) and Zhang & Webb (1996) many more genera and species have been described and at the present time 39 genera and 153 species are known. The group is distinguished by the transverse striations or carina on the fore margin of the head and long antennae situated high on the face. During ongoing studies of Pacific Paraboloponina, two new genera from Malaysia were discovered with an unusual development of the aedeagal base, giving rise to three caudally directed processes. This similarity suggests that the two genera may be closely related, despite their somewhat different external appearance. In the present paper the two new genera and three new species are described from Malaysia (Sarawak and Sabah).

Material and methods

Morphological terminology and methods follow Webb (1981), Zhang (1990), Zhang & Webb (1996) and Dietrich (2005). External morphological characters were observed by stereo microscope (Leica 205c; Zoom 2000) and male genitalia were examined and photographed using an advanced stereomicroscope (Discovery V20, Zeiss) with photos captured by an attached CCD camera (AxioCam ICc5, Zeiss). Type specimens are deposited in the University of Wales (UK) and the Illinois Natural History Survey (INHS, Champaign, IL, USA).

Malaysiapona gen. nov.

Type species: *Malaysiapona brevipennis* sp. nov.

Description. Length (including tegmen). Male: 6.5–9.5 mm.

Body olive green; crown with orange band occupying distal half, with a black spot (*filamenta*) or without a black spot (*brevipenis*) close to eye; face dark greenish at base and stramineous apically; pronotum with antero-medial, medial and posterolateral pairs of symmetrical orange markings; mesonotum and scutellum each with pair of submedial orange markings, apex of scutellum orange; forewing smoky hyaline with costal and commissural margins orange and orange spot at base of corium. Front tibia orange.

Body oblong, relatively broad, somewhat depressed. Head slightly broader than pronotum; anterior margin relatively thick in profile, weakly bicarinate with few additional fine transverse striations; ocelli small, situated in sulcus of foremargin, separated from adjacent eye by distance equal to own diameter (*filamenta*) or twice own diameter (*brevipenis*). Crown flat, slightly depressed behind anterior margin, anterior margin broadly rounded in dorsal view, only slightly longer medially than next to eye. Face with lateral frontal sutures strongly divergent dorsad of antennal pits, extended to ocelli; clypeus relatively narrow, lightly swollen dorsally, depressed ventrally; clypeal suture straight; anteclypeus with lateral margins concave, apex expanded; lora broad; gena emarginate below eyes; antenna longer than half body length; antennal pits situated near upper corner of eyes, encroaching onto clypeus; antennal ledges moderately developed and oblique but not carinate. Pronotum well produced between eyes, hind margin slightly concave; lateral margin short, carinate; posterior two thirds with irregular transverse striations; mesonotum and scutellum together slightly broader than long; scutellar suture arcuate. Forewing with four apical cells and three subapical cells, inner subapical cell open; two anterior branches of R reflexed; appendix broad. Fore femur with AM1 near midheight of femur, AV with few stout setae in basal half; IC with series of several fine, close-set setae; fore tibia with dorsal setal arrangement of rows AD and PD: 1 (small stout seta) +5. Hind femur macrosetae 2+2+1.

Male genitalia. Pygofer dorsal bridge moderately long; lobe very long, constricted basally, tapered to acutely rounded apex, posterior margin smooth or denticulate, processes absent, with numerous macrosetae. Valve broadly triangular. Xth segment long, anterodorsal margin 'V' shaped in dorsal view. Subgenital plate with base broad and rounded laterally, apex attenuate, macrosetae absent, scattered long fine setae present. Style apophysis stout with lateroposterior angle acutely produced (avicephaliform), finely denticulate, preapical lobe poorly developed. Connective small, Y-shaped with stem broadened apically, arms thickened and weakly divergent. Aedeagus with dorsal apodeme moderately well developed, column-like, bifurcate apically; shaft short to moderately long, curved dorsad without processes; gonopore large, apical on ventral surface; basal preatrium-like area present, laterally expanded with sides forming curved sclerotised rods, fused dorsally to distal part of basal apodeme and ventrally extended into a pair of elongate processes, directed caudally, central area weakly sclerotised with a thin transverse band subbasally giving rise to a medial caudally directed process. Small accessory sclerite (paraphysis) between connective and aedeagus.

Female unknown.

Distribution. Malaysia (Sabah and Sarawak).

Remarks. This genus can be distinguished externally by its bright orange markings and short head with anterior margin relatively thick in profile. The new genus, together with *Chandrapona* gen. nov. can be distinguished in the male genitalia by the unusual laterobasal development of a preatrium-like area on the aedeagus giving rise to two caudally directed ventral processes and a third process in *Malaysiapona* (see descriptions). This genus is also similar in head shape and bright orange markings to three other Paraboloponina genera, *Roxasellana* Zhang & Zhang, *Tenompoella* Zhang & Webb and *Nakula* Distant. In addition to its unusual aedeagus *Malaysiapona* differs from *Roxasellana* by its Y-shaped connective and aedeagus with a simple non-branched dorsal apodeme, from *Tenompoella* by lacking a posterior process on the connective and from *Nakula* in having the vertex longer than next to eyes.

Etymology. The genus name is a combination of its locality Malaysia and the ending of the type genus *Parabolopona* of the subtribe.

Key to species of *Malaysiapona* (males)

1	Style with apophysis bilobed; aedeagus with unpaired ventral process broad.	<i>brevipenis</i> sp. nov.
-	Style with apophysis trilobed; aedeagus with unpaired ventral process slender	<i>filamenta</i> sp. nov.

Malaysiapona brevipennis sp. nov.

(Fig. 1)

Diagnosis. This species can be distinguished in the male genitalia by the apically bi-lobed style apophysis and robust aedeagal shaft.

Description. Length (including tegmen). Male: 6.5 mm.

Crown with anterior orange band occupying less than half length, with three small black spots; pronotum slightly wider than long, forewing veins testaceous.

Head with coronal suture long; ocelli twice own diameter from adjacent eyes; fore femur AV with 5 stout setae; IC with 11 setae.

Male genitalia. Style relatively narrow, apex of apophysis bi-lobed, lateral lobe weakly developed; aedeagal shaft robust, abruptly tapered distally to acute apex in lateral view, column-like in ventral view, with several subapical denticuli on ventral surface; with a pair of elongate processes extended caudally from base of preatrium-like area, sinuate, another single shorter elongate process arising slightly more dorsad. Small accessory sclerite (paraphysis) between connective and aedeagus.

Material examined. Holotype: ♂, Malaysia (Borneo), Sabah, Danum Valley, 5°01'N, 117°47'E, 30-xi-1987, 200 m, light trap, understory forest, lowland mixed dipterocarp forest grid, No.52, A.H. Kirk-Spriggs (NMW).

Distribution. Malaysia (Sabah).

Etymology. The species takes its name from the robust aedeagal shaft.

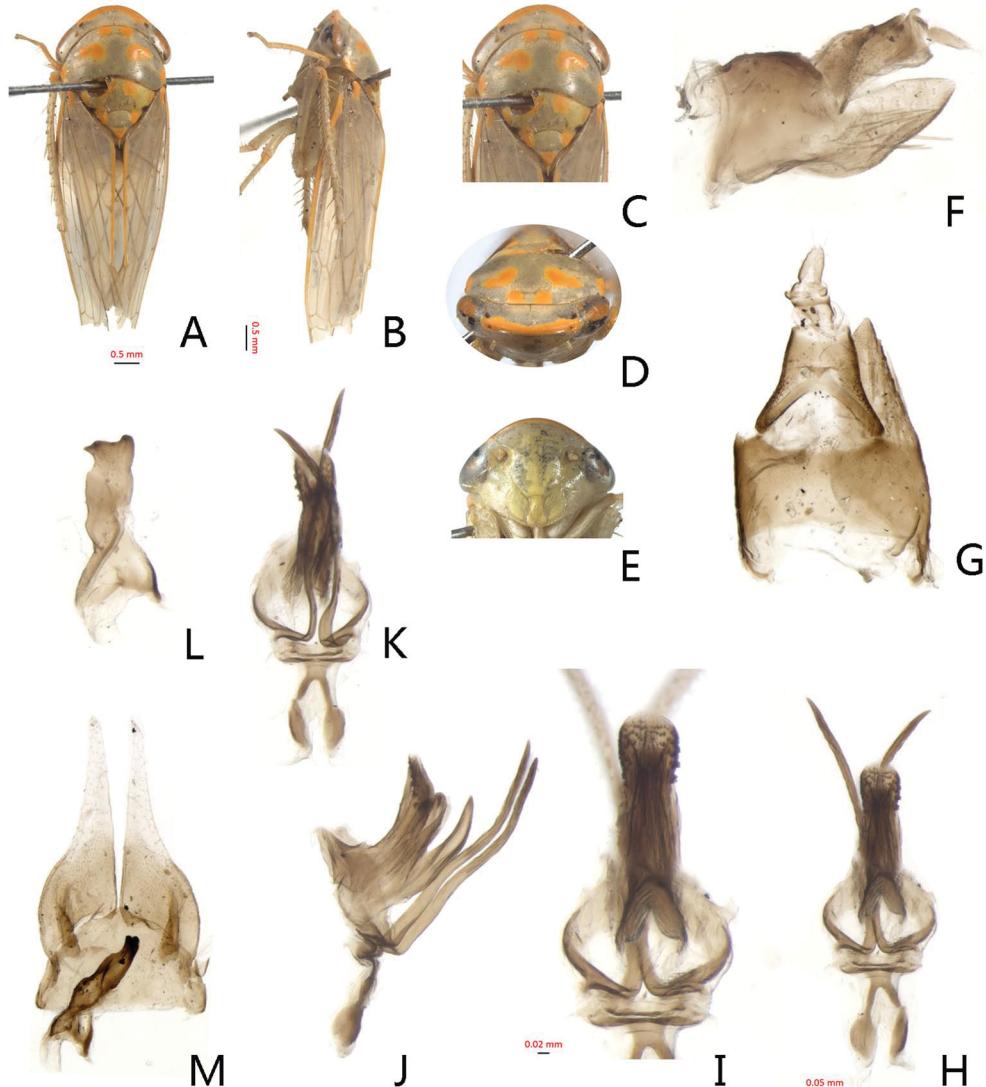


FIGURE 1. *Malaysiapona brevipennis*. A–B. Male, dorsal and lateral view; C–D. head, dorsal and anterodorsal view; E. face; F–G. pygofer, lateral and dorsal view; H–I. aedeagus and apex of aedeagus, dorsal view; J–K. connective and aedeagus, lateral and ventral view; L. style, ventral view; M. valve and subgenital plate, ventral view

Malaysiapona filamenta sp. nov.

(Fig. 2)

Diagnosis. This species can be distinguished in the male genitalia by the apically tri-lobed style apophysis and filamentous aedeagal processes.

Description. Length (including tegmen). Male: 6.7 mm.

Colour and external features as in generic description.

Male genitalia. Style moderately broad, apex of apophysis trilobed, lateral lobe moderately well developed; aedeagal shaft evenly tapered to acute apex, laterally compressed basally, with a pair of filamentous sinuate processes extended caudally from base of preatrium-like area, another single shorter elongate process arising slightly more dorsad.

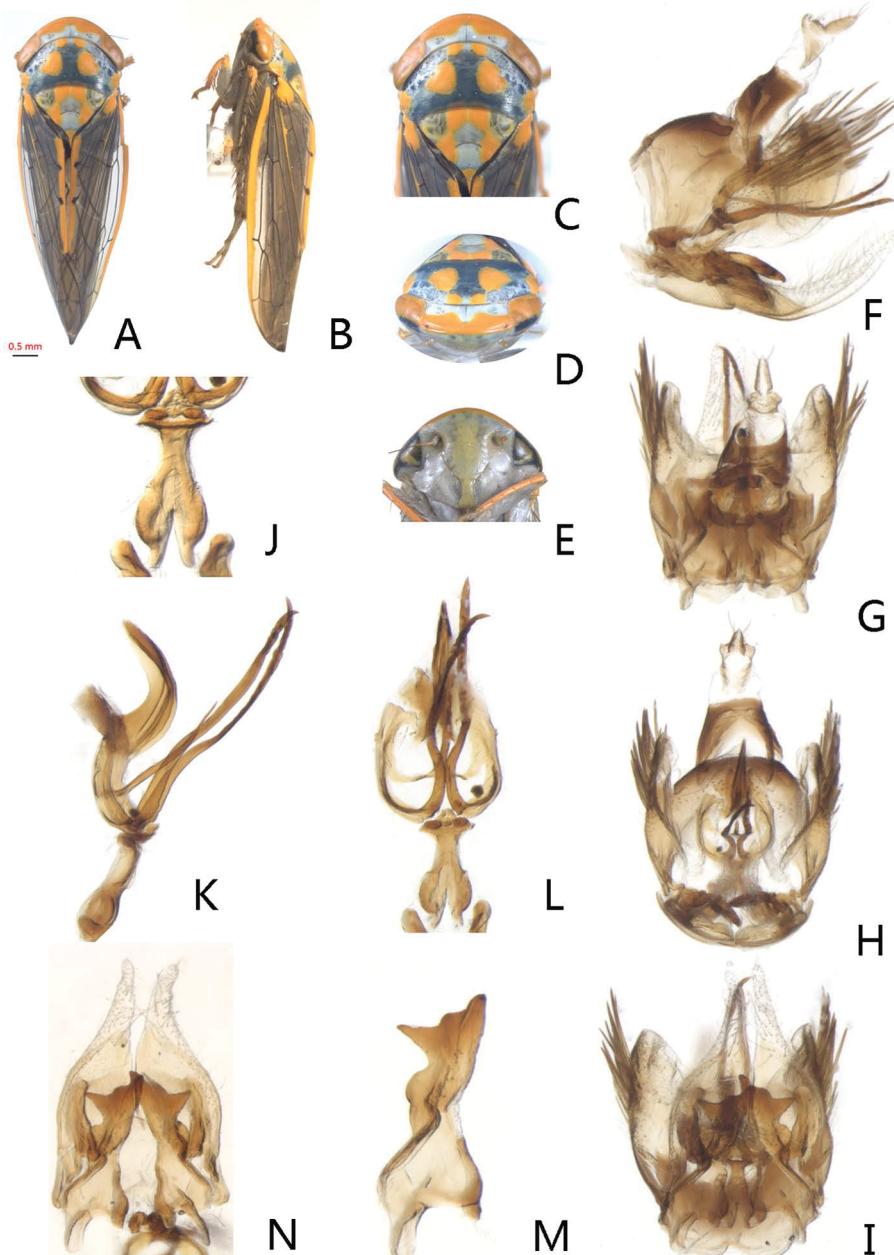


FIGURE 2. *Malaysiapona filamenta*. A–B. Male, dorsal and lateral view; C–D. head, dorsal and anterodorsal view; E. face; F–I. pygofer, lateral, dorsal, caudal and ventral view; J. connective and appendage, ventral view; K–L. connective and aedeagus, lateral and ventral view; M. style, dorsal view; N. valve and subgenital plate, ventral view

Material examined. Holotype: ♂, Malaysia (Borneo), Sarawak, Gunung Mulu National Park, 30–50m elev., N4°02'32.9" E114°48'46.7", 16~22-x-2006. Coll. J.R. Cryan & J.M. Urban (INHS).

Distribution. Malaysia (Sarawak).

Etymology. This species takes its name from the filamentous aedeagal processes.

***Chandrapona* gen. nov.**

Type species: *Chandrapona vespertilis* sp. nov.

Description. Body yellowish; head with narrow black band on fore margin flanked by red.

Crown acutely triangular with sides slightly concave, longer in middle than next to eyes, with fine oblique striations in middle and transverse striations on margin. Face longer than wide, slightly concave dorsally in profile; ocelli large, marginal, 3 times diameter from eyes; clypeus narrow, distally longitudinally carinate; lateral frontal sutures nearly parallel, extending to ocelli; clypellus expanded apically; lora broad; gena broad and emarginate below eyes; antennae longer than half body length; antennal pits situated near upper corners of eyes. Pronotum with lateral margin short, carinate, posterior two thirds with irregular transverse striations. Scutellum as long as pronotum, scutellar suture arcuate. Forewing with four apical and three subapical cells, inner subapical cell open basally; without crossvein between claval veins; appendix broad.

Male genitalia. Pygofer dorsal bridge long, with dorsoanterior apodemes present; lobe very long and strongly tapered to acutely rounded apex, without macrosetae, ventral margin with an articulated process. Xth segment moderately long. Valve broadly semicircular. Subgenital plate with lateral margin convex at base, thereafter abruptly tapered to an acutely rounded apex; macrosetae absent. Style short similar in length to connective with basal arms widely spaced. Connective Y-shaped with arms equal in length to stem. Aedeagus with shaft curved dorsally in lateral view, with pair of lateral flange-like expansions from ventral margin, gonopore large, apical on ventral surface; basal apodeme short; basal preatrium-like area present, laterally expanded with sides forming curved sclerotised rods, fused dorsally to distal part of basal apodeme and ventrally extended into a pair of elongate processes, directed caudally, central area weakly sclerotised. Without small accessory sclerite (paraphysis) between connective and aedeagus.

Female unknown.

Distribution. Malaysia (Sabah).

Remarks. This genus is distinguished by the incurved lateral margins of the vertex with apex acutely rounded and by its distinctive male genitalia. The pygofer lobe has a distinctive caudal appendage (which may be moveable) and the aedeagal shaft has lateral expansions. In addition, the new genus together with *Malaysiapona* can be distinguished by the unusual laterobasal development of a preatrium-like area on the aedeagus giving rise to two, or three (*M. filamenta*), caudally directed ventral processes (see descriptions).

Etymology. This genus is named for Prof. C.A. Viraktamath for his immense contribution to leafhopper systematics.

***Chandrapona vespertilis* sp. nov.**

(Fig. 3)

Length (including tegmen). Male: 7.5 mm.

Colour and external characters as in generic description. Fore femur with AM1 near midheight, IC with series of 11 fine setae; fore tibia with dorsal setal arrangement of rows PD and AD 4+4.

Male genitalia with pygofer appendage very long, curved slightly ventrally and tapered to acute apex. Style lateral lobe distinct, apophysis short and robust, apex truncate with lateroapical angle slightly produced. Aedeagus with shaft short, laterally compressed, tapered distally to hook-like apex; lateral flange-like processes very large batwing-like; ventral processes long and stout, strongly curved dorsally, extending to beyond shaft apex.

Material examined. Holotype: ♂, Malaysia (Borneo), Sabah, Bukit Monkobo, base camp, stunted hill forest, 51°48'N, 116°58'E, 7.viii.1987, 900 m, light trap, A.H. Kirk-Spriggs (NMW).

Distribution. Malaysia (Sabah).

Etymology. The species takes its name from *vespertilio* the Latin name for a bat for the bat wing-like processes of the aedeagus.

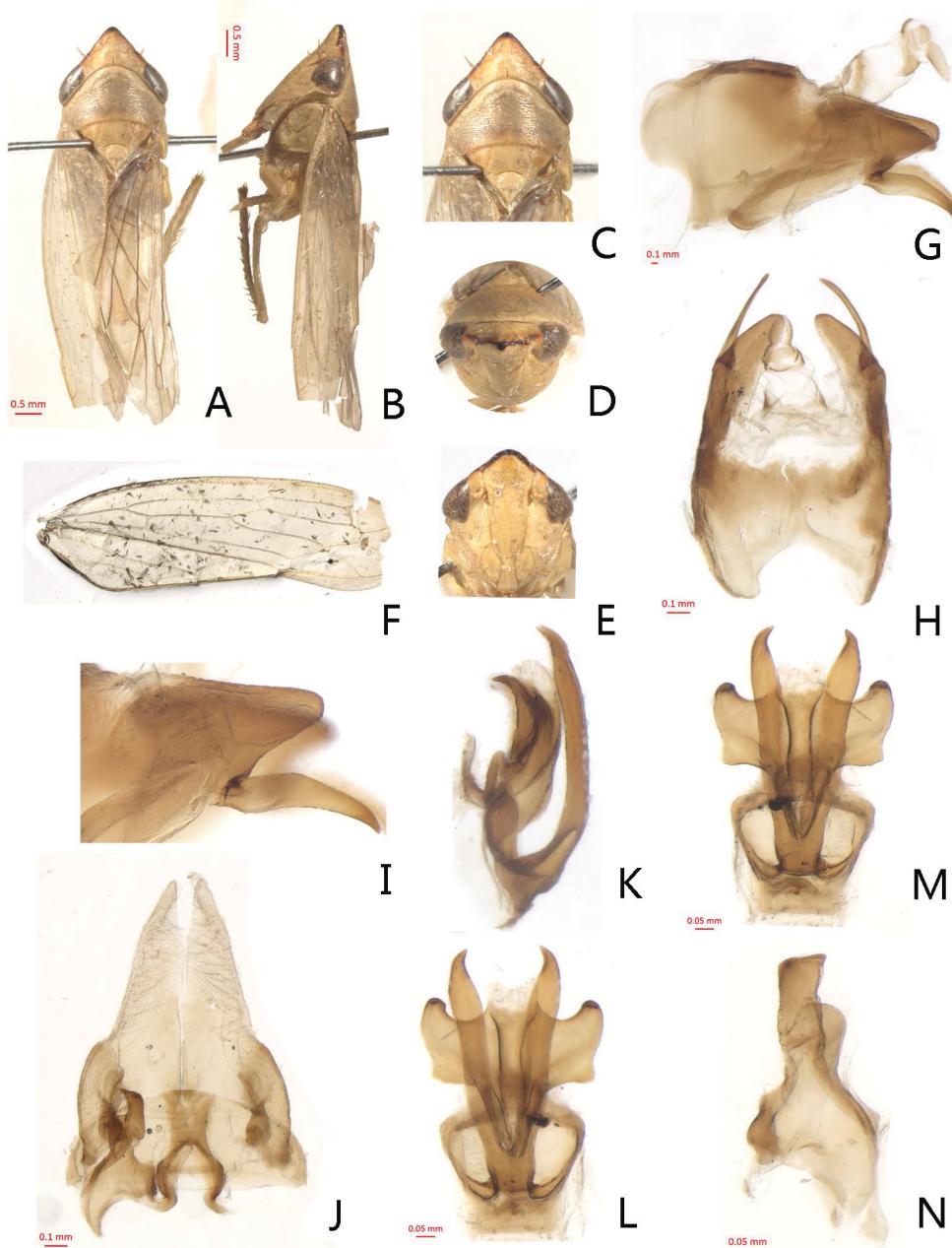


FIGURE 3. *Chandrapona vespertilis*. A–B. Male, dorsal and lateral view; C–D. head, dorsal and anterodorsal view; E. face; F. forewing; G–H. pygofer, lateral and dorsal view; I. apex of pygofer, lateral view; J. valve and subgenital plate, ventral view; K–M. aedeagus, lateral, ventral and dorsal view; N. style, ventral view.

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References

Dietrich, C.H. (2005) Keys to the families of Cicadomorpha and subfamilies and tribes of Cicadellidae (Hemiptera: Auchenorrhyncha). *Florida Entomologist*, 88 (4), 502–517.
[https://doi.org/10.1653/0015-4040\(2005\)88\[502:KTTFOC\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2005)88[502:KTTFOC]2.0.CO;2)

Webb, M.D. (1981) The Asian, Australasian and Pacific Paraboloponinae (Homoptera: Cicadellidae). *Bulletin of the British Museum (Natural History) (Entomology)*. 43, 39–76.

Zhang, Y.L. (1990) *A Taxonomic Study of Chinese Cicadellidae (Homoptera)*. Tianze Eldonejo, Yangling, 218 pp.

Zhang, Y.L. & Webb, M.D. (1996) A revised classification of the Asian and Pacific Selenocephalinae leafhoppers (Homoptera: Cicadellidae). *Bulletin of the Natural History Museum, Entomology Series*, 65, 1–103.