

Neokutara, a new arboreal leafhopper genus (Hemiptera: Cicadellidae: Deltocephalinae), with four new species from Sulawesi, Indonesia

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Abstract: A new leafhopper genus *Neokutara* **gen. nov.** is described and placed in the *Kutara* Distant group (Deltocephalinae: Drabescini: Paraboloponina). The genus is established for four new species from Sulawesi (Indonesia), i.e., *N. angustata* **sp. nov.**, *N. bicolorata* **sp. nov.**, *N. bifurcata* **sp. nov.** and *N. expansa* **sp. nov.** (type species). Keys to the three genera of the *Kutara* group: *Kutara* Distant, *Neokutara* and *Papuakutara* Lu, Webb & Zhang, and to species of *Neokutara* are provided.

Key words: Auchenorrhyncha; taxonomy; key

新增脉叶蝉属——印度尼西亚苏拉威西一树栖叶蝉新属并记四新种（半翅目：叶蝉科：角顶叶蝉亚科）
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摘要: 描记采自印度尼西亚苏拉威西的增脉叶蝉类（角顶叶蝉亚科：胫槽叶蝉族：脊翅叶蝉亚族）1新属，即新增脉叶蝉属 *Neokutara* **gen. nov.**，并描记4新种：*N. angustata* **sp. nov.**，*N. bicolorata* **sp. nov.**，*N. bifurcata* **sp. nov.** 和 *N. expansa* **sp. nov.**（模式种），提供了该属及近缘属（*Kutara*, *Papuakutara*）的检索表和该属的种检索表。

关键词: 头喙亚目；分类；检索表

Introduction

The leafhopper subtribe Paraboloponina (Drabescini) is one of the most diverse groups of arboreal deltocephaline leafhoppers in tropical parts of the Oriental and Australian regions. Its members are most readily distinguished by their moderate to large size and head with fore margin with transverse striations or carina and long antennae arising high on the face. In our ongoing research on the group, we discovered four new species from Sulawesi (Indonesia) belonging to a new genus, *Neokutara* **gen. nov.** The new genus is near *Kutara* Distant, 1908 and *Papuakutara* Lu, Webb & Zhang, 2018, together forming the *Kutara* group, distinguished by a short crown with hind margin elevated. The new taxa are here described and keys to the genera of *Kutara* group and to species of *Neokutara* are provided.

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Material and methods

The material studied was collected over a nine-year period on Sulawesi (Indonesia) by Martin Brendell (1980), various collectors on the Royal Entomological Society of London, Project Wallace expedition (1985) and Hans Duffels (1989). Information on Project Wallace was given by Knight & Holloway (1990) and information on Hemiptera communities in Sulawesi was obtained via various publications (see Casson & Hodkinson 1991). One specimen was collected by canopy fogging and the remainder were mainly collected by light trap indicating an arboreal lifestyle for species of the genus as in other members of the tribe.

Morphological terminology follows Webb (1981) and Zhang & Webb (1996). External and genitalic characteristics were observed with the aid of a stereo microscope (Zoom 2000, Leica) and photographs taken using an advanced stereo microscope (Discovery V20, Zeiss) and CCD camera (AxioCam ICc5, Zeiss).

Type specimens were deposited in the Naturalis Biodiversity Center (NBC), Leiden, Germany (borrowed from the Zoological Museum of Amsterdam, Netherlands and transferred to NBC recently) and the Natural History Museum (BMNH, London, U.K.).

Taxonomy

Key to the genera of the *Kutara* group

1. Crown with coronal suture present; forewing without net-like brown markings; aedeagal shaft curved dorsally 2
- Crown with coronal suture absent; forewing with or without net-like brown markings; aedeagal shaft not curved dorsally, sometimes upturned apically (Fig. 1H). Sulawesi *Neokutara* **gen. nov.**
2. Crown and pronotum with transverse dark bands; forewing without cross-vein between claval veins; connective with stem long, straight or sinuate in lateral view; aedeagus with a single basal process curved to one side. Papua New Guinea *Papuakutara*
- Crown and pronotum without transverse dark bands, crown with or without dark transverse spot medially; forewing with cross-vein between claval veins; connective with stem moderately long, angled at midlength in lateral view; aedeagus without a single basal process curved to one side. Asia and the Pacific *Kutara*

Neokutara **gen. nov.**

Type species: *Neokutara expansa* Lu, Webb & Zhang.

Description. Head and thorax yellowish with or without brown markings. Head touched with brown on posterior margin with or without a single pair of spots medially. Forewing brownish hyaline with cells sometimes greyish hyaline, with or without veinlet-like brown pattern.

Head broader than pronotum; crown with anterior margin broadly rounded, similar in length medially than next to eye, transversely sulcate subapically; anterior margin with a transverse carina above and below ocelli with fine transverse striations between, ocellus 1.5–2.5 times own diameter distance from eye; coronal suture vestigial; hind margin elevated, disc smooth with variable longitudinal or oblique fine striations. Face with lateral frontal suture extended directly to ocellus (or laterad of ocellus in *N. bifurcata*); anteclypeus expanded apically, with basal suture straight; lora broad; gena emarginate below eye; antenna longer

than half body length; antennal pit situated near upper corner of eyes in facial view; antennal ledge weak. Pronotum with lateral margin short and carinate; faintly transversely wrinkled. Mesonotum similar in length to pronotum; scutellar suture arched slightly anterad. Forewing with four apical cells and three closed subapical cells, appendix broad; veins of clavus connected to each other by crossvein and crossvein present between outer vein and claval suture. Fore femur with AM1 long in middle and AV1 short, and having some small scales on surface, with series of about 13 setae (IC) distally in anterior view. Fore tibia with dorsal setal arrangement 7+4. Hind femur macrosetae 2+2+1.

Male genitalia. Pygofer lobe acute to rounded caudally; with subapical small internal ledge; pair of spinous membranous lobes in phragma; with several macrosetae subapically. Valve trapezoidal with small triangular projection between bases of subgenital plates. Subgenital plate elongate, triangular with lateral margin concave and mesal margin straight, base well sclerotized, attenuate distal section partly membranous, macrosetae absent, fine setae sparse and inconspicuous. Style with apical apophysis and preapical lobe developed. Connective Y-shaped, stem elongate with apex slightly broadened and Y-shaped; anterior arms weakly divergent. Aedeagus with dorsal apodeme weakly developed or absent; shaft elongate, relatively straight in lateral view, with or without upturned apex with ventral process extending beyond shaft, gonopore apical.

Female genitalia. Second valvulae blade-shaped with a subbasal dorsal prominence and several robust teeth over distal half of dorsal margin.

Distribution. Indonesia (Sulawesi).

Etymology. The genus name, a feminine noun, refers to the similarity of this new genus to species of the genus *Kutara*.

Remarks. The new genus forms a group with *Kutara* and *Papuakutara* in having the crown short and elevated posteriorly and the forewing with the inner subapical cell closed and a transverse vein present between the claval veins. Apart from the posteriorly elevated crown it is also similar externally to *Drabescoides* Kwon & Lee, 1979.

Checklist to species of *Neokutara*

Neokutara angustata **sp. nov.** — Indonesia (Sulawesi Utara).

Neokutara bicolorata **sp. nov.** — Indonesia (Sulawesi Tengah).

Neokutara bifurcata **sp. nov.** — Indonesia (Sulawesi Tenggara).

Neokutara expansa **sp. nov.** — Indonesia (Sulawesi Utara).

Key to species the of genus *Neokutara*

1. Crown whitish with a pale brown anterior band; pronotum and mesonotum with yellow and green coloration (Fig. 2A)..... *N. bicolorata*
- Crown without a pale brown anterior band; pronotum and mesonotum yellow with brownish markings (Figs 1A; 3A; 5A)..... 2
2. Forewings with brown veinlet-like pattern (Fig. 5A); style without a bifurcate apophysis; aedeagus with a basal apodeme and shaft upturned apically..... 3
- Forewings without brown veinlet-like pattern, with a few brown markings in cells (Fig. 3L); style apophysis bifurcate (Fig. 4I); aedeagus without basal apodeme and shaft not upturned apically (Fig. 4G) *N. bifurcata*
3. Aedeagus narrow basally with ventral process expanded to near apex in lateral view (Fig. 5H)

- *N. expansa*
 -. Aedeagus with shaft expanded at base with ventral process narrow throughout length in lateral view (Fig. 1H)..... *N. angustata*

1. *Neokutara angustata* sp. nov. (Fig. 1)

Description. Length (including tegmen). Male: 5.0–5.1 mm; female: 5.0–5.2 mm.

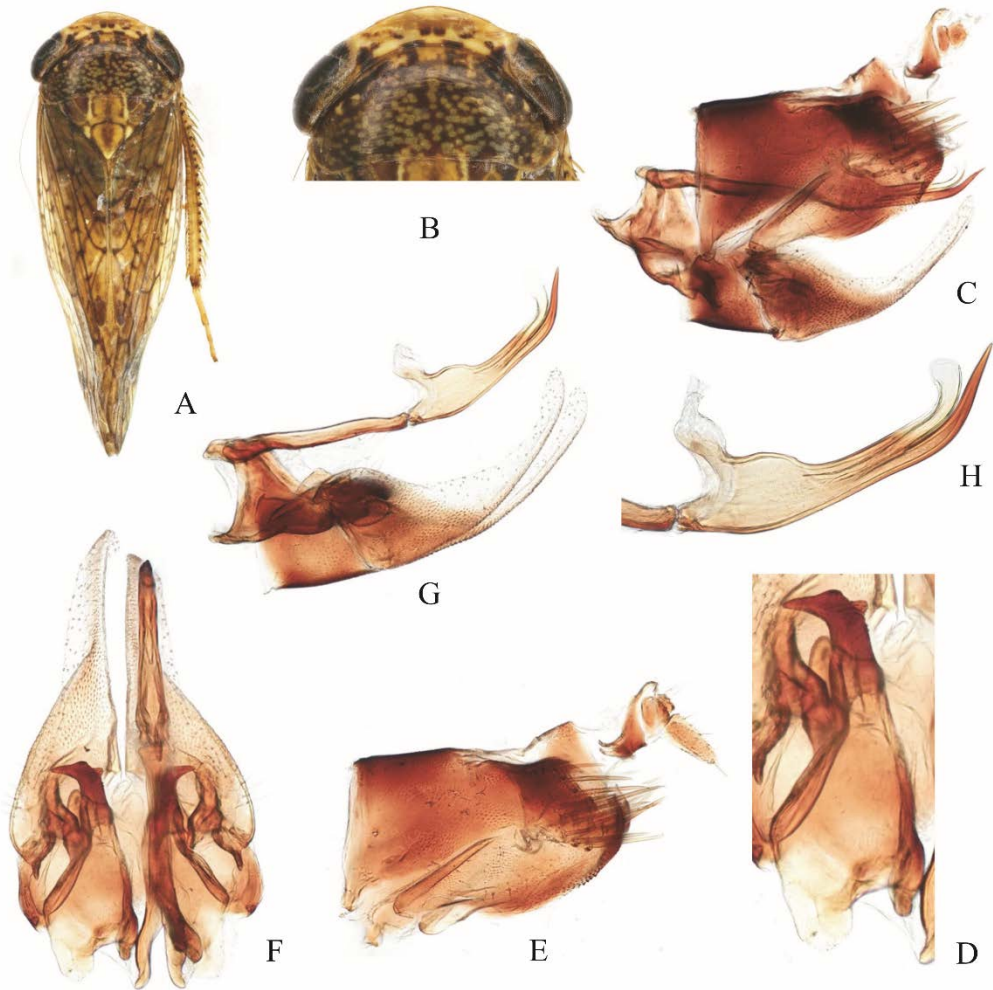


Figure 1. *Neokutara angustata* sp. nov., holotype. A. Habitus, dorsal view; B. Head and pronotum, dorsal view; C–H. Male genitalia: C. Genital capsule, lateral view; D. Style, dorsal view; E. Pygofer and anal tube, lateral view; F–G. Valve, subgenital plate, style, connective and aedeagus, dorsal and lateral views; H. Aedeagus, lateral view.

Crown yellow touched with brown including a spot against each eye posteriorly, a pair of posterior spots medially and medially on inside of posterior elevation. Face yellow with a brown patch below eye; antennal pedicel brown. Pronotum brown with many small yellow spots. Mesonotum yellow with basal triangles and medial area brown. Forewing brownish

hyaline with some brown patches in cells and some brown veinlet-like markings.

Male genitalia. Pygofer broadly rounded apically. Style apophysis narrow, tapered to acute apex with subapical heel and small protuberance. Aedeagus basally swollen in lateral view with short basal apodeme, shaft straight basally upturned apically, with single basal ventral process similar in width to shaft and slightly upturned apically, extended slightly beyond apical gonopore to acute apex.

Holotype. ♂, **Indonesia**, Sulawesi Utara, Dumoga-Bone National Park, 06–10-II-1985, Rothampstead light trap, site 2220 m, H. Barlow, NHMUK 010747798 (BMNH). **Paratypes.** **Indonesia**, same data as holotype except, 1♂, 09–20-XI-1985, 200 m, site 1; 1♂, Gng Ambang F.R. nr Kotamobagu, Tray 30, Fog. 7, 1200 m, 18-II-1985, without collection information. All material collected on the Royal Entomological Society London, Project Wallace Expedition to Sulawesi (BMNH).

Etymology. The species epithet *angustata*, meaning narrow, refers to the narrow aedeagal process in lateral view.

Remarks. This species is similar in external appearance to *N. expansa* but can be distinguished in the male genitalia by the different shape of the aedeagus and style.

2. *Neokutara bicolorata* sp. nov. (Fig. 2)

Description. Length (including tegmen). Male: 5.4–5.8 mm; female: 5.4–6.1 mm.

Crown whitish with anterior margin with pale brown band edged with darker brown posteriorly, a variable spot near each eye posteriorly and medially on inside of posterior elevation; face yellow heavily mottled with brown, antennal pedicel and spot below eye, dark brown. Pronotum and mesonotum yellowish green with lateral margins whitish, sometimes with an indistinct brown mark on lateral margin of mesonotum just basad of midlength. Forewing brownish hyaline with brown veinlet-like markings. Subgenital plates reddish distally.

Male genitalia. Pygofer lobe tapered to acutely rounded apex, with serrate caudoventral margin. Style with apophysis narrow tapered to acute apex with subapical heel and small protuberance. Aedeagus as in *N. angustata* but less broad basally in lateral view.

Female pregenital segment medially produced caudally.

Holotype. ♂, **Indonesia**, Sulawesi Utara, Dumoga-Bone National Park, II-1985, Royal Entomological Society London, Project Wallace Expedition, NHMUK 013589121 (BMNH). **Paratypes.** 1♂, same data as holotype; 1♀, same data as holotype except Clark's camp, 1140 m, V-1985, J.H. Martin, at light, NHMUK 013589120; 1♂, same data as holotype except Edward's camp, 664 m, J.H. Martin, at light; 3♂2♀, **Indonesia**, Sulawesi, Tengah, Nr. Morowali, Ranu River Area, 27-I–20-IV- 1980, M.J.D. Brendell, at light (BMNH).

Etymology. The species name takes its name from the contrasting pale head and thorax and brownish hyaline forewings.

Remarks. The species can be distinguished externally by the contrasting pale head and thorax with the dark forewings (Figs 2A-C).

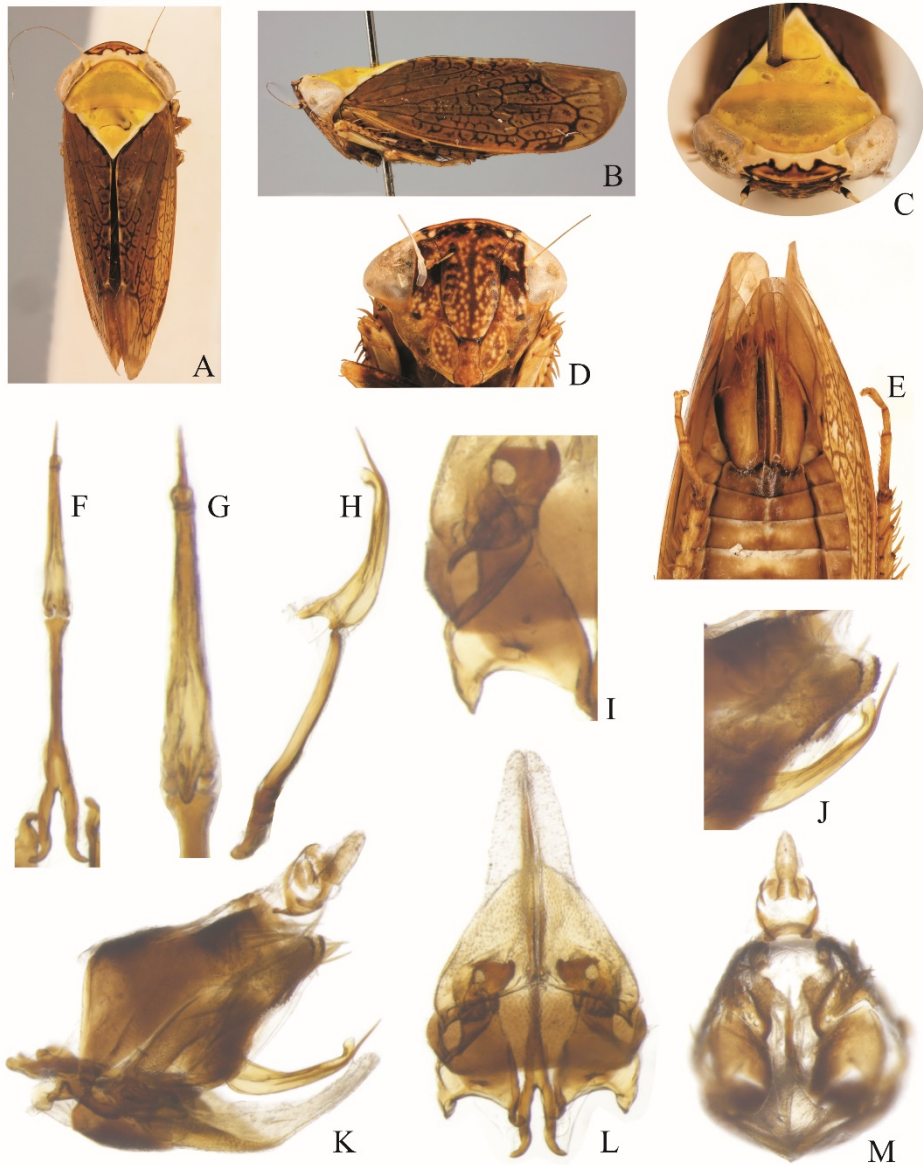


Figure 2. *Neokutara bicolorata* sp. nov., A–D. Holotype; E–M. Paratypes. A, B. Habitus, dorsal and lateral views; C. Head and thorax, dorsoanterior view; D. Face; E. Female abdominal terminalia, ventral view; F–M. Male genitalia. F. Aedeagus and connective, dorsal view; G. Aedeagus, dorsal view; H. Aedeagus and connective, lateral view; I. Style, dorsal view; J. Apex of pygofer, lateral view; K. Genital capsule, lateral view; L. Valve, subgenital plates, styli, connective and aedeagus, ventral view; M. Genital capsule, caudal view.

3. *Neokutara bifurcata* sp. nov. (Figs 3, 4)

Description. Length (including tegmen). Male: 7.5–8.0 mm; female: 7.5–8.5 mm.

Head and thorax yellow; crown with a posterior brown spot near each eye and a few fainter spots between. Pronotum variably mottled with brown; mesotum with basal triangles

brown or edged with brown. Forewings with variable yellow patches, apex of claval veins with brown spot, some cells marked with brown centrally and apical veins more heavily marked with dark brown.

Lateral frontal suture extended laterad of ocellus.

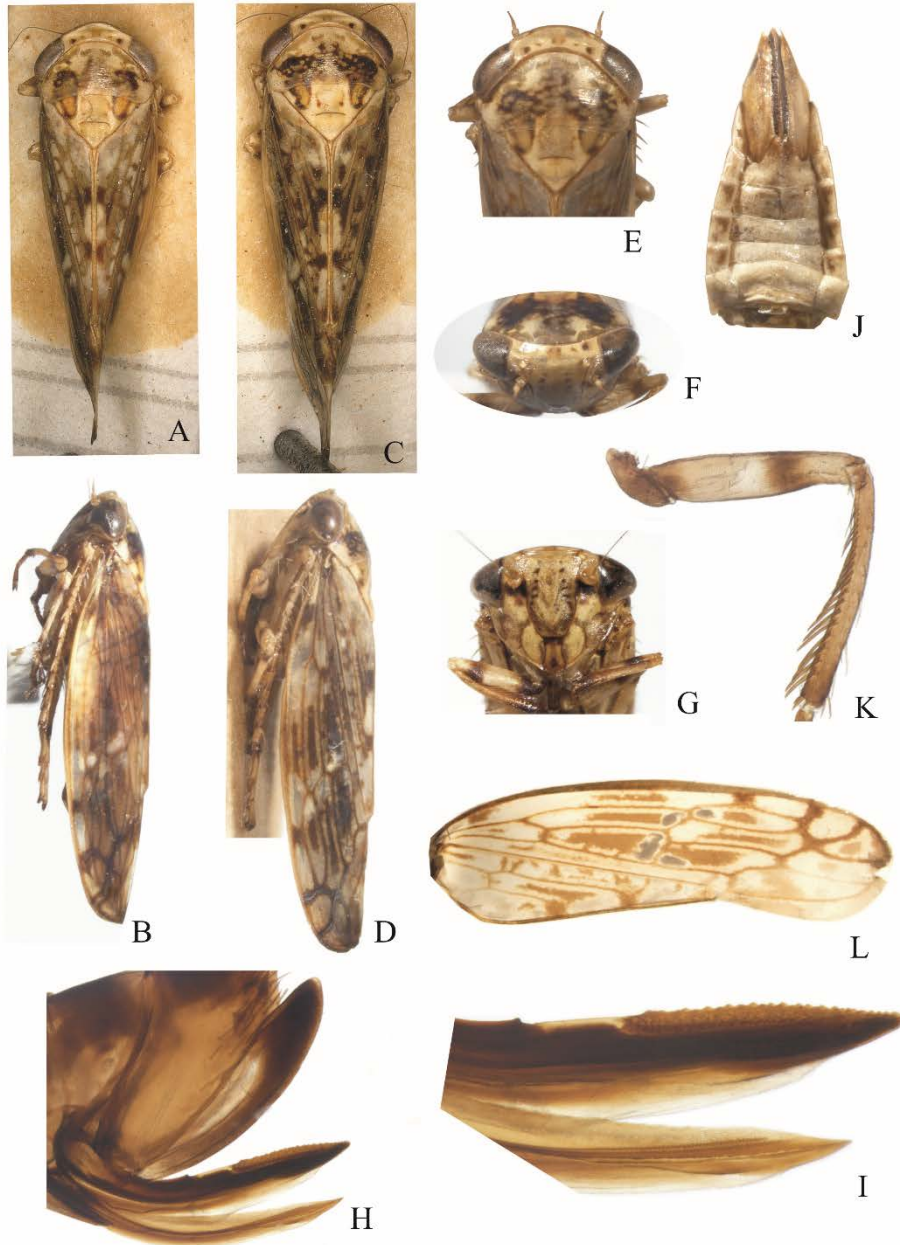


Figure 3. *Neokutara bifurcata* sp. nov., paratypes. A, B. ♂, dorsal and lateral views; C, D. ♀, dorsal and lateral views; E, F. Head and thorax, dorsal and dorsoanterior views; G. Face; H. Female abdominal terminalia, lateral view; I. Apex of 1st and 2nd valvulae, lateral view; J. Female abdomen, ventral view; K. Fore leg, anterior view; L. Forewing.

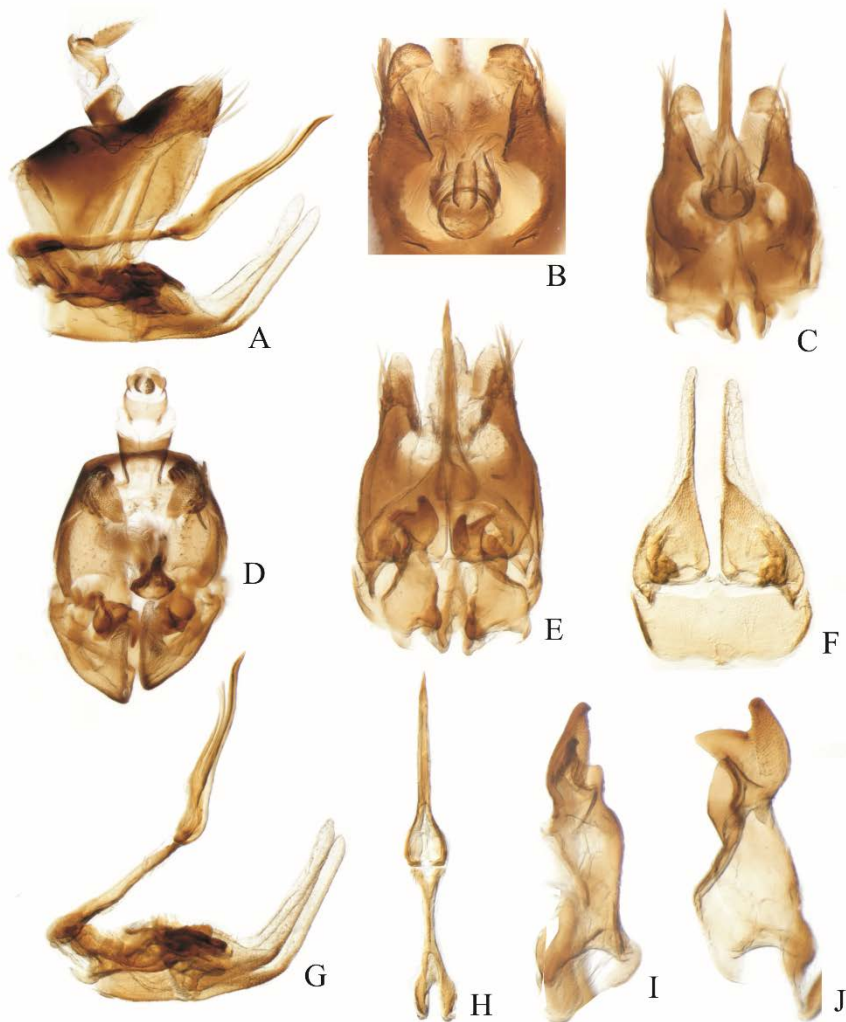


Figure 4. Male genitalia of *Neokutara bifurcata* sp. nov., holotype. A–E. Genital capsule, lateral, dorsocaudal, dorsal, caudal and ventral views; F. Valve and subgenital plates, ventral view; G, H. Aedeagus and connective, lateral and ventral views; I, J. Style, lateral and ventral views.

Male genitalia. Pygofer lobe tapered to acutely rounded apex. Style apophysis bilobed with each lobe stout, inner lobe narrowly rounded apically, outer lobe acute apically. Aedeagus with dorsal apodeme vestigial, shaft narrow throughout length and slightly sinuate in lateral view, extended slightly beyond apical gonopore to acute apex.

Female with pregenital sternite medially strongly produced caudally.

Holotype. ♂, **Indonesia**, Sulawesi Tenggara, 3°49'S, 121°40'E, nr Gng Watowila NE of Kolaka, 1600 m, 04-XI-1989, J.P. Duffels (NBC). **Paratypes.** 4♂5♀, same data as holotype (NBC, BMNH).

Etymology. This species takes its name from the bifurcate style apex.

Remarks. This species is tentatively included in the genus based on the shape of its

aedeagus. However, it differs from other congeners in colour pattern, particularly lacking brown veinlet like markings on the forewing and in the male genitalia by the bilobed style apical apophysis. It also has the laterofrontal sutures extending to the lateral margin of the ocelli rather than directly to the ocellus and lacks the distinctly posteriorly elevated vertex, present in other species.

4. *Neokutara expansa* sp. nov. (Fig. 5)

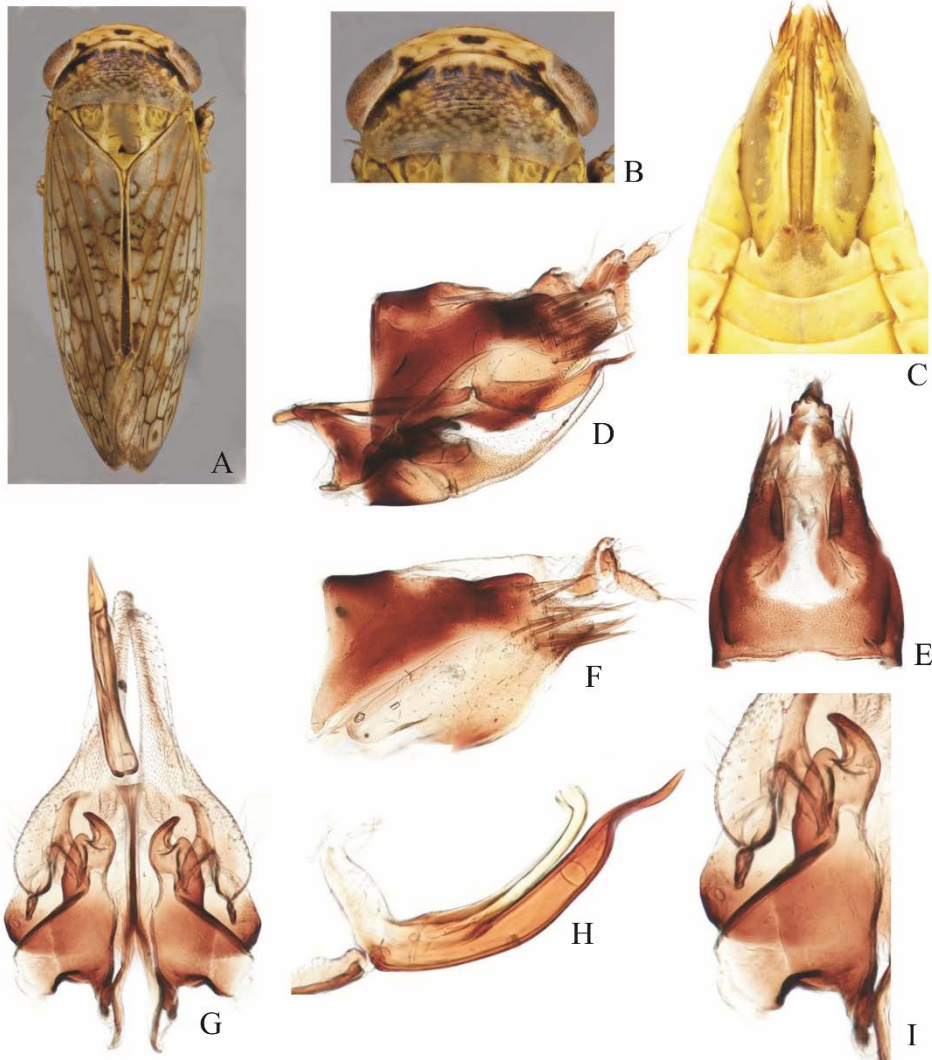


Figure 5. *Neokutara expansa* sp. nov. A–C. Paratype female; D–I. Paratype male. A. Habitus, dorsal view; B. Head, dorsal view; C. Abdominal terminalia, ventral view; D. Genital capsule, lateral view; E, F. Pygofer, lateral and dorsal views; G. Valve, subgenital plate, style, connective and aedeagus, dorsal view; H. Aedeagus, lateral view; I. Style, dorsal view.

Description. Length (including tegmen). Male: 6.0–6.7 mm; female: 6.2–7.0 mm.

Crown touched with brown including a spot against each eye posteriorly, a posterior spot

medially on disc and to each side on inside of posterior elevation. Pronotum heavily brown marked with pale spots. Forewing cells brownish or greyish hyaline with brown irroration forming in some cases a few to numerous veinlets.

Male genitalia. Pygofer lobe abruptly tapered to narrowly rounded apex. Style apophysis short and robust, curved laterally and tapered to acute apex. Aedeagus with dorsal apodeme present; shaft upturned apically, with single basal ventral process broad in lateral view except narrow sinuate apical part.

Holotype. ♂, **Indonesia**, Sulawesi Utara, Dumoga-Bone N.P., II-1985. **Paratypes.** 9♂8♀, same data as holotype; 13♂8♀, same data as holotype except May, June 1985, Torout nr base camp, ca 200 m, M.R. Wilson. All Royal Entomological Society London, Project Wallace Expedition (BMNH).

Etymology. The species takes its name from the expanded aedeagal process in lateral view.

Remarks. This species is very similar to *N. angustata* in coloration but can be distinguished by the basally broader aedeagal process in lateral view.

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