

## Two new species in the subfamily Perlinae (Plecoptera, Perlidae) from China

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### Abstract

Two species in the genera *Neoperla* and *Kamimuria* (Plecoptera: Perlidae) from China are described as new: *Kamimuria guangxia* sp. n., and *Neoperla mesostyla* sp. n. The new species are compared to similar taxa.

### Keywords

Plecoptera, Perlidae, *Neoperla*, *Kamimuria*, new species, China

### Introduction

*Kamimuria* and *Neoperla* (Plecoptera: Perlidae) are the most speciose genera within the subfamily Perlinae within China (Du et al. 1999, DeWalt et al. 2013). *Neoperla* is represented by more than 70 known species in China, comprising about 30% of species in the genus (DeWalt et al. 2013). These were described by Chu (1929), Du

(1999, 2000 a, b), Du and Sivec (2004, 2005), Du and Wang (2005, 2007), Du et al. (2001), Sivec and Zwick (1987), Wu (1935, 1938, 1948, 1962, 1973), Wu and Claassen (1934), Yang and Yang (1990, 1991), Yang and Yang (1992, 1993, 1995 a, b, 1996, 1998), Li et al. (2011), Li and Wang (2011), Li et al. (2012), Li et al. (2012), Li and Li (2013) and Li et al. (2013). *Kamimuria* is represented by nearly 50 species in China, comprising about 70% of the described species within the genus (DeWalt et al. 2013; Sun and Du 2012; Li et al. 2012). In the present paper, we describe two additional Perlinae species as new to science: *Kamimuria guangxia* sp. n., and *Neoperla mesostyla* sp. n. from the Guangxi autonomous region. These species seem most closely related to congeners known from other southeastern Asian areas, as noted in the text. All types, including paratypes, are deposited in the Entomological Museum of China Agricultural University (CAU). Aedeagi were everted using the cold maceration technique of Zwick (1983) or Sivec et al. (1988).

## Taxonomy

### *Kamimuria guangxia* Li & Wang, sp. n.

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[http://species-id.net/wiki/Kamimuria\\_guangxia](http://species-id.net/wiki/Kamimuria_guangxia)

Figs 1–3

**Type material.** Holotype: male, originally labeled as China: Guangxi autonomous region, Tian'e County, Buliuhe River, light trap, 25.0005 N, 107.1738 E, 16 Aug. 2002, Ding Yang. Paratypes: 2 males, same data as holotype.

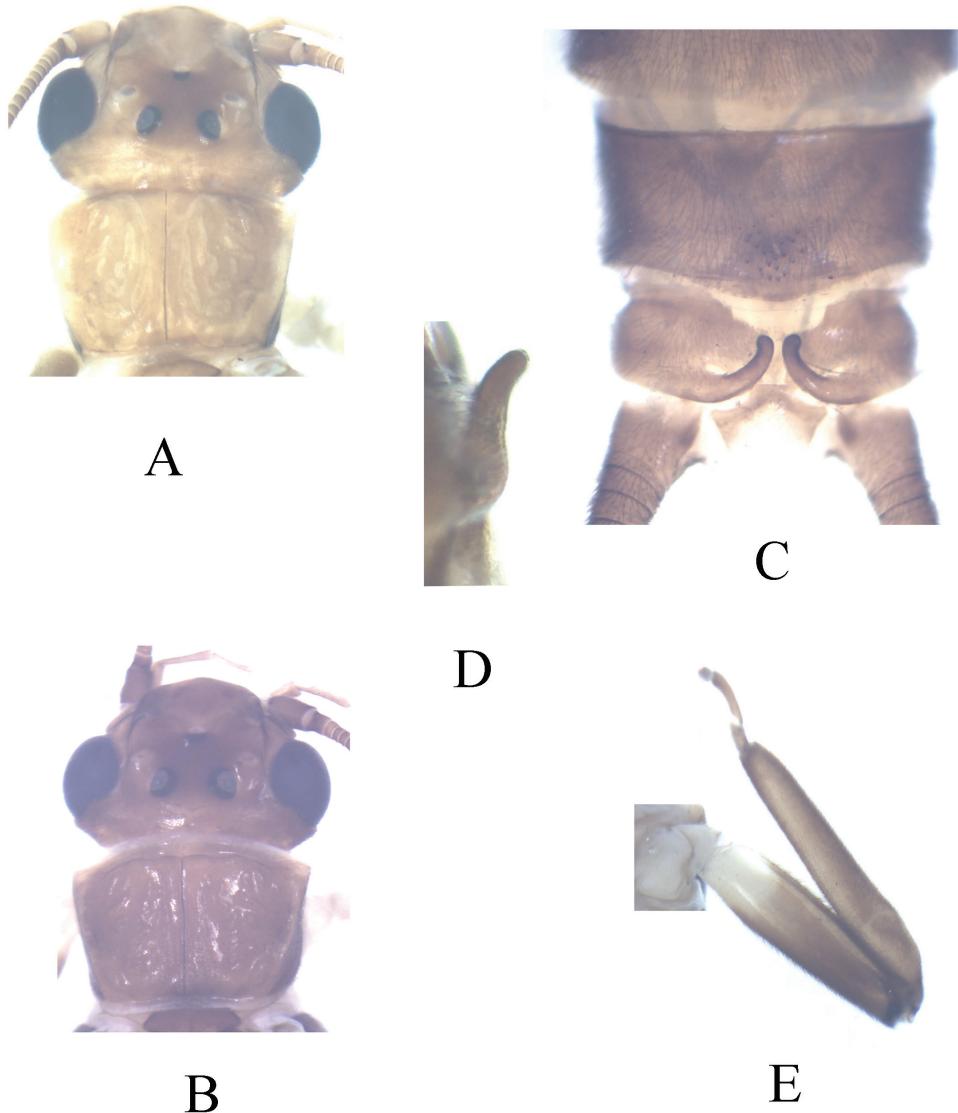
**Male.** Forewing length 14.8–15.0 mm. General body color dark brown. Head slightly wider than pronotum, generally brown with darker, quadrate interocellar region, the anterior corners of which extend laterally in teneral specimen, M-line pale (Figs 1A–B); compound eyes dark; antennae dark brown. Pronotum dark brown with rugose surface (Fig. 1A); wing membrane brown, veins darker; femora pale basally, otherwise dark (Fig. 1E).

**Terminalia.** Hemiterga slender, finger-like, and slightly swollen apically, without hidden groove (Figs 2A–B). Tergum 9 with posteromedial patch of sensilla basiconical on a somewhat darker sclerite. Tergum 8 without sensilla patch. (Figs 1C, 2A). Setal brushes present on sterna 4–6. Aedeagus before eversion oval, apex tapering, hidden sac with apex darker and palm-like, with two lateral sharp claws and a median pad (Fig. 2C). Aedeagal sac membranous, medially constricted, apex expanded, heart-shaped and mostly covered with fine spinules, the apex and basal half of the sac bare (Fig. 3).

**Female.** Unknown.

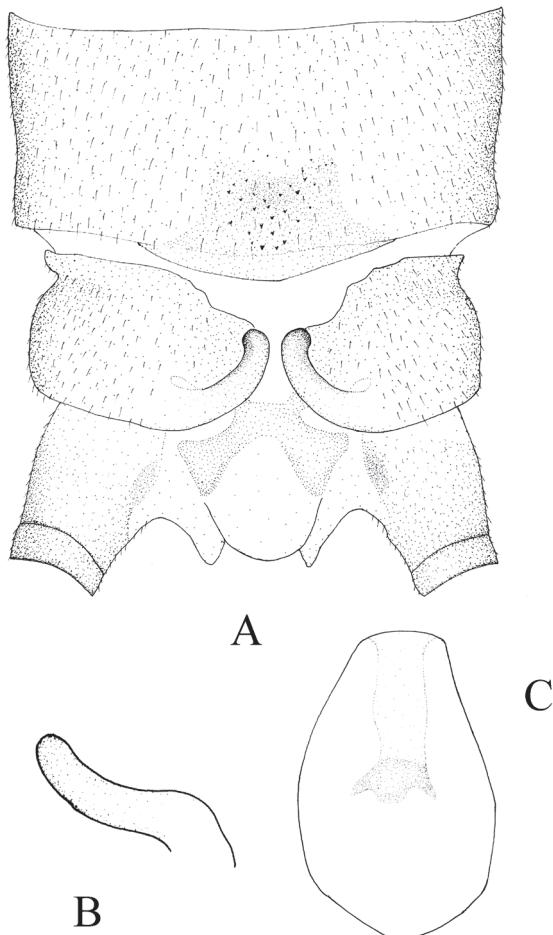
**Etymology.** The specific epithet refers to Guangxi autonomous region where the type specimen was collected.

**Distribution.** China (Guangxi).



**Figure 1.** *Kamimuria guangxia* Li & Wang, sp. n. (male). **A** Head and pronotum, dorsal view (teneral specimen) **B** Head and pronotum, dorsal view (older specimen) **C** Terminalia, dorsal view **D** Hemitergal process, lateral view **E** Foreleg, lateral view.

**Diagnosis.** The male of *K. guangxia* is characterized by the hemiterga being slightly swollen apically. The aedeagal sac is membranous, medially constricted, apex expanded, heart-shaped and mostly covered with fine to tiny spines (Figs 1C, 2B). The new species is similar to *K. atra* Sivec & Stark, 2008, a species known both from Vietnam and Thailand, in general body color and features of terminalia, but tergum 8 of the new species has no sensilla basiconica patch.



**Figure 2.** *Kamimuria guangxia* Li & Wang, sp. n. (male). **A** Terminalia, dorsal view **B** Hemitergal process, lateral view **C** Aedeagus before eversion, ventral view.

***Neoperla mesostyla* Li & Wang, sp. n.**

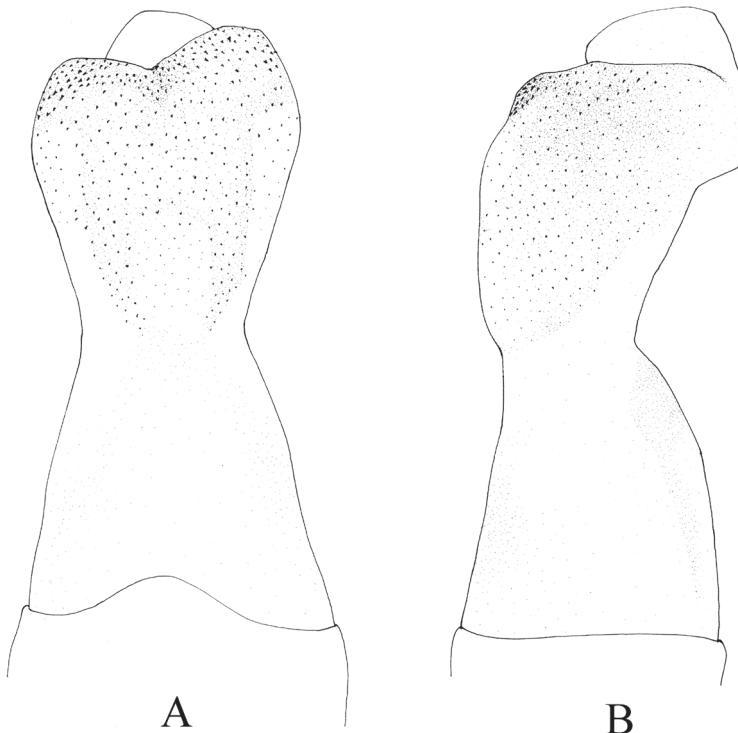
urn:lsid:zoobank.org:act:151A4084-8B37-424B-BD9A-8F8CB4A5857A

[http://species-id.net/wiki/Neoperla\\_mesostyla](http://species-id.net/wiki/Neoperla_mesostyla)

Figs 4–5

**Type material.** Holotype: male, China: Guangxi autonomous region, Mt. Jiuwan-shan, Jiuren Station next to Rongjiang River, 950–1150 m, 25.0673 N, 109.2563 E, light trap, 3 Aug. 2003, Zhang Li-Li. Paratype: 1 male, same data as holotype.

**Male.** Forewing length ca. 14.8 mm. General body color brown. Distance between ocelli nearly as wide as diameter of ocellus. Head slightly wider than pronotum, with a small triangular interocellar patch and another black triangular patch on frons (Fig. 4A); compound eyes dark; antennae dark brown. Pronotum pale brown with darker



**Figure 3.** *Kamimuria guangxiana* Li & Wang, sp. n. (male). **A** Aedeagus, dorsal view **B** Aedeagus, lateral view.

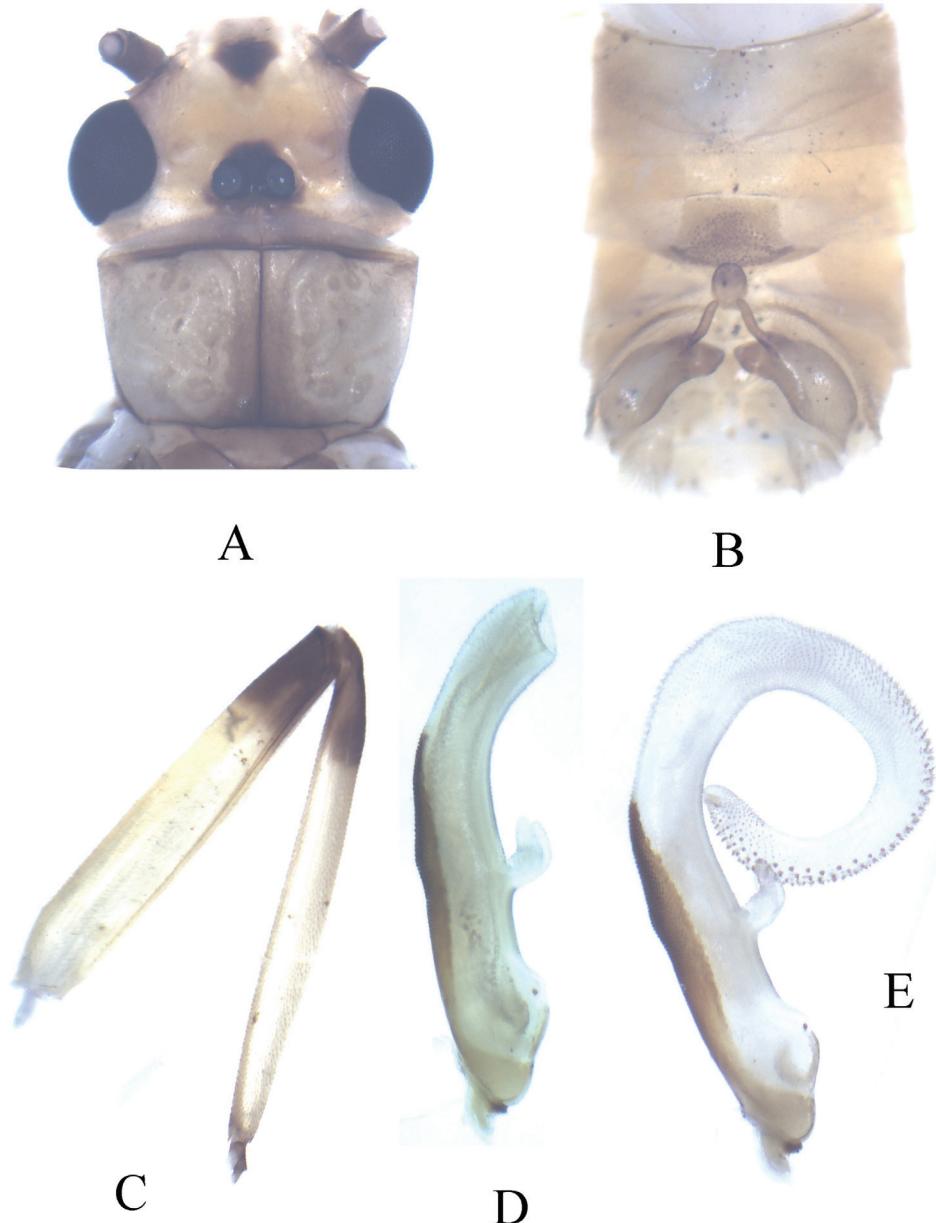
anterior and median stripes (Fig. 4A); wing membrane pale brown, veins dark; legs yellowish brown, distal fourth of femora, basal fifth of tibiae and tarsi darker (Fig. 4C).

**Terminalia.** Process of tergum 7 forming a large subquadrate plateau, mostly covered with dense sensilla basiconica patches but with few sensilla basiconica at margins (Fig. 4B). Tergum 8 with an upcurved tongue-shaped process, with sparse ventral tiny spines. Tergum 9 without sensilla basiconica patches. Hemitergal lobes slender and curved laterally near midlength (Fig. 4B). Aedeagal tube plump (length  $3\times$  width at basal bulb), ventrally with a mesal bifurcate lobe bearing a basal common stem, dorsal surface heavily sclerotized, the pigmentation slightly expanded mesolaterally, membranous sac  $1.5\times$  as long as tube and gradually curved ventrad to form a loop; sharp to stout small spines occur along dorsal surface toward apex (Figs 4D, E, 5).

Zwick & Sivec defined the bulb side of the tube as being ventral, however, the sac of the new species forms a loop so that the spines of apical half of the dorsal surface are actually ventrally directed; we herein discuss dorsal or ventral surfaces of the sac as if it were straight, as such in *Neoperla flagellata* Li & Murányi (Li et al. 2012) and *N. monacha* Stark & Sivec (Stark and Sivec 2008).

**Female.** Unknown.

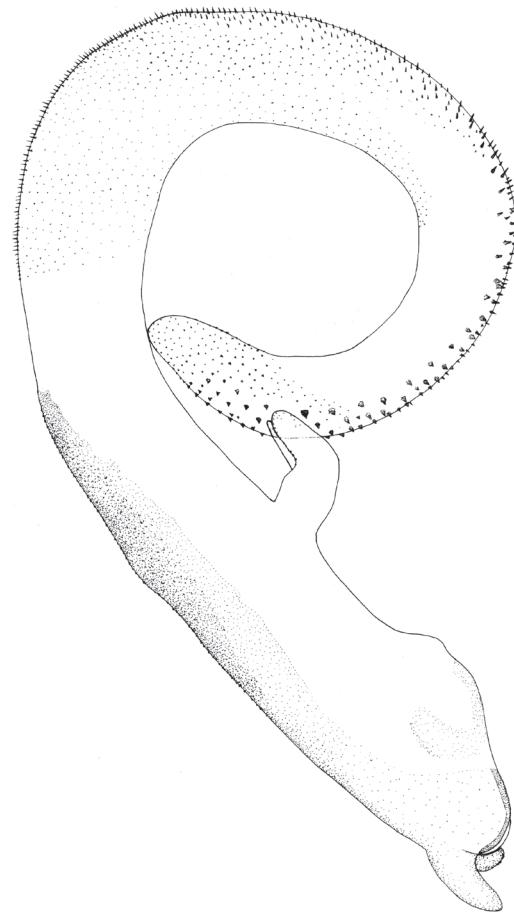
**Etymology.** The specific epithet refers to the mesal position of the bifurcate lobe on the ventral surface of the aedeagal tube.



**Figure 4.** *Neoperla mesostyla* Li & Wang, sp. n. (male). **A** Head and pronotum, dorsal view **B** Terminalia, dorsal view **C** Hindleg (part of tarsi in this leg missing), lateral view **D** Aedeagus before eversion, lateral view **E** Aedeagus, lateral view.

**Distribution.** China (Guangxi).

**Diagnosis.** The new species appears to belong to a well differentiated subgroup of the montivaga species group (Zwick 1983) that has as tube characteristics a dark,



**Figure 5.** *Neoperla mesostyla* Li & Wang, sp. n. Male aedeagus, lateral view.

elongate sclerite dorsally and a bilobed, mostly membranous process ventrally (Zwick and Sivec 1985). Based on these features, several other species could also be assigned to this *diehli* subgroup: *Neoperla han* Stark, *N. mnong* Stark, *N. furcostyla* Li & Qin, *N. forcipata* Yang and Yang & *N. yao* Stark.

The new species is characterized by the aedeagal tube being short ( $\leq 3 \times$  width of bulb) and the ventral, bifurcate process being midlength on the tube. Additionally, the apical half of the sac is clothed with heavy spinules on the dorsal surface. *Neoperla diehli* has an elongate slender aedeagal tube (length  $\geq 4 \times$  tube width), the ventral processes originate at the apex of the tube, and the heavy spinules are restricted to the tip of the sac (see Fig. 21 in Zwick and Sivec 1985). *Neoperla mesostyla* is easily distinguishable from other members of the group by its very long sac and relatively short Y-lobe. *Neoperla han* Stark and *N. yao* Stark have elongate Y-lobes (Figs 6, 10 in Stark 1987); *N. mnong* Stark, *N. furcostyla* Li & Qin, and *N. forcipata* Yang & Yang have a short or very short aedeagal sac (Fig. 7 in Stark 1987; Figs 2 B, C in Li et al. 2013).

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