



## STUDIES ON *SINACRONEURIA* YANG & YANG (PLECOPTERA: PERLIDAE) WITH DESCRIPTION OF NEW SPECIES FROM CHINA AND VIETNAM

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### ABSTRACT

Two previously unrecognized members of genus *Sinacroneuria* Yang & Yang are described and compared with known congeners. *Sinacroneuria biocellata* sp. n. is described from a single specimen collected in northern Vietnam, and *S. bicornuata* sp. n. is described from a specimen collected in southwest China.

**Keywords:** Plecoptera, *Sinacroneuria*, China, Vietnam, New species

### INTRODUCTION

Genus *Sinacroneuria* was proposed by Yang & Yang (1995a) for *S. orientalis* Yang & Yang, an acroneurine species with a massive, more or less Y-shaped aedeagal sclerite. Uchida (1990) had also recognized this group in his thesis and proposed a generic name and a new Japanese species, but these names were never formally published. The genus remained monotypic until Du et al. (1999) added *Kamimuria flavata* Navas, but clearly several additional Chinese species currently placed in *Acroneuria* should be transferred to this genus. Because the genus is being revised by a colleague who already has proposed these transfers in an unpublished manuscript, we limit this study to the description of two distinctive new species. The discovery of additional members of the group in China and Vietnam is not surprising, however it is unusual to find among the Oriental fauna a moderate to large acroneurine stonefly with only two ocelli, and the other species we are proposing also appears to be distinctive. Specimens are placed in the Royal Ontario Museum, Toronto (ROM) or the United States National Museum of Natural History, Washington (USNM) as indicated in the text. The following key will separate males of the new species

from *S. orientalis*, the only current species for which males are known.

### RESULTS AND DISCUSSION

#### Provisional Key for *Sinacroneuria* Males

(*S. flavata* unknown)

- 1 Biocellate (Fig. 1); tergum 9 without small posteromesal lobe (Fig. 2) ..... *biocellata*
- 1' Triocellate; tergum 9 with small posteromesal lobe (Fig. 5) ..... 2
- 2 Tergum 9 spinule patch narrowly divided; tergum 10 with complete median membrane strip; Y-stem of aedeagal sclerite about as long as arms ..... *orientalis*
- 2' Tergum 9 spinule patch undivided (Fig. 5); tergum 10 membrane strip not reaching anterior margin; Y-stem of aedeagal sclerite about half as long as arms (Fig. 6) ..... *bicornuata*

#### *Sinacroneuria biocellata* n. sp.

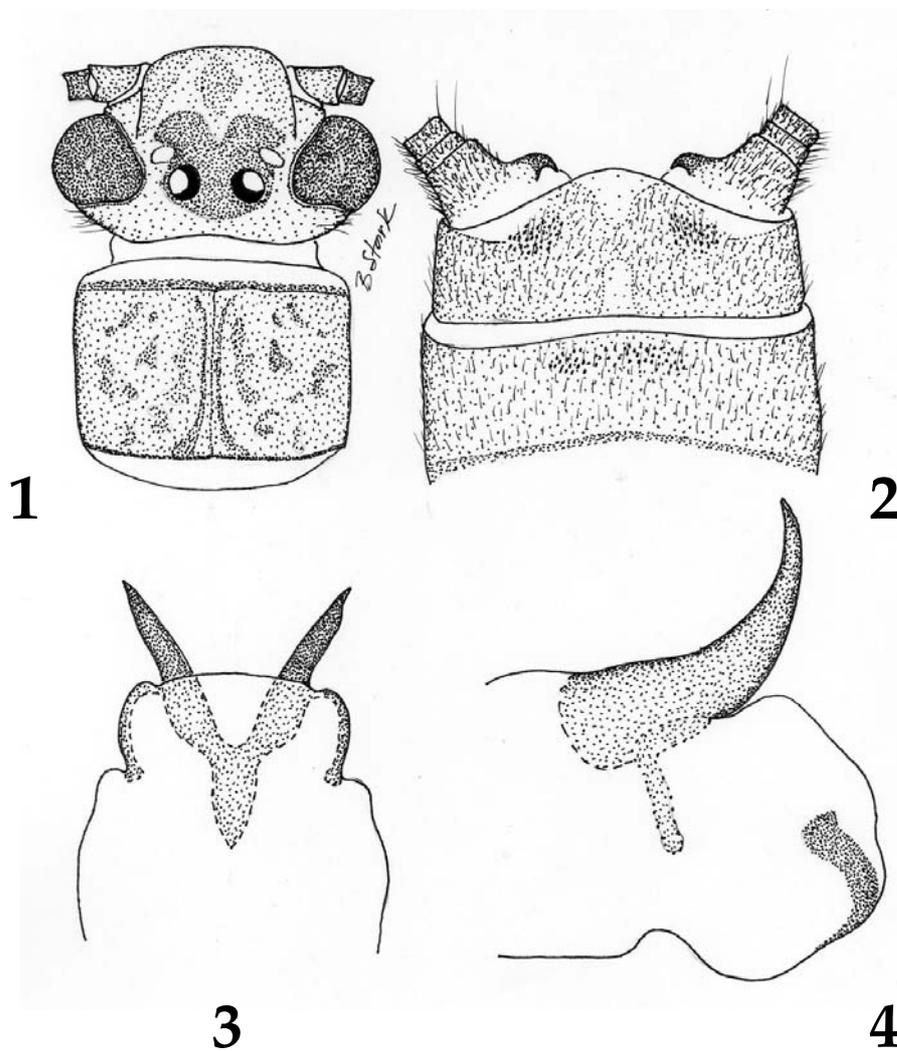
(Figs. 1-4)

**Material studied.** Holotype ♂ from Vietnam, Lao Cai, Sapa, large waterfall on Sapa to Lai Chau road,

UV light, 8 May 1995, D. Currie, B. Hubley, J. Swann, ROM 956022 (ROM)

**Adult habitus.** Biocellate. Head with large dark brown area covering ocelli and extending to M-line (Fig. 1); lappets and saggitate mark forward of M-line pale brown. Pronotum pale brown with scattered obscure rugosities on disk; margins and median suture dark brown. Wing membrane transparent, veins pale brown. Femora pale but slightly darker along dorsal edge; tibiae brown. Segments on basal half of antennal flagellum dark brown but apical segments pale.

**Male.** Forewing length 16.5 mm. Tergum 9 with sparse mesal patch of sensilla basiconica narrowly divided along midline; tergum 10 with sensilla basiconica patches widely separated and tergum almost divided by membrane (Fig. 2). Paraproct tips small, acute and darkly sclerotized. Cerci short, consisting of about 14 segments. Hammer present on sternum 9. Y-stem of aedeagal sclerite short (Fig. 3); arms wide basally and about 2.5 times long as stem; ventral surface of aedeagus armed with a slender, median sclerite, sparsely covered with small spines (Fig. 4).



Figs. 1-4. *Sinacroneuria biocellata*. 1. Head and pronotum, 2. Male terminalia, 3. Aedeagus, dorsal aspect, 4. Aedeagus, lateral aspect.

**Female.** Unknown.

**Larva.** Unknown.

**Etymology.** The species name refers to the presence of only two ocelli on this species.

**Diagnosis.** *Sinacroneuria biocellata* adults are distinguished from those of congeners by the presence of only two ocelli. Males appear to have more widely separated sensilla patches on tergum 10 and those on tergum 9 are less abundant and form a more-or-less united patch. Additionally the aedeagal sclerite Y-stem is relatively shorter than is shown by Yang & Yang (1995) for *S. orientalis*. Yang & Yang (1995) also show the 10<sup>th</sup> tergum of the male to be completely divided by membrane, and this species has the membrane strip incomplete.

*Sinacroneuria bicornuata* sp. n.

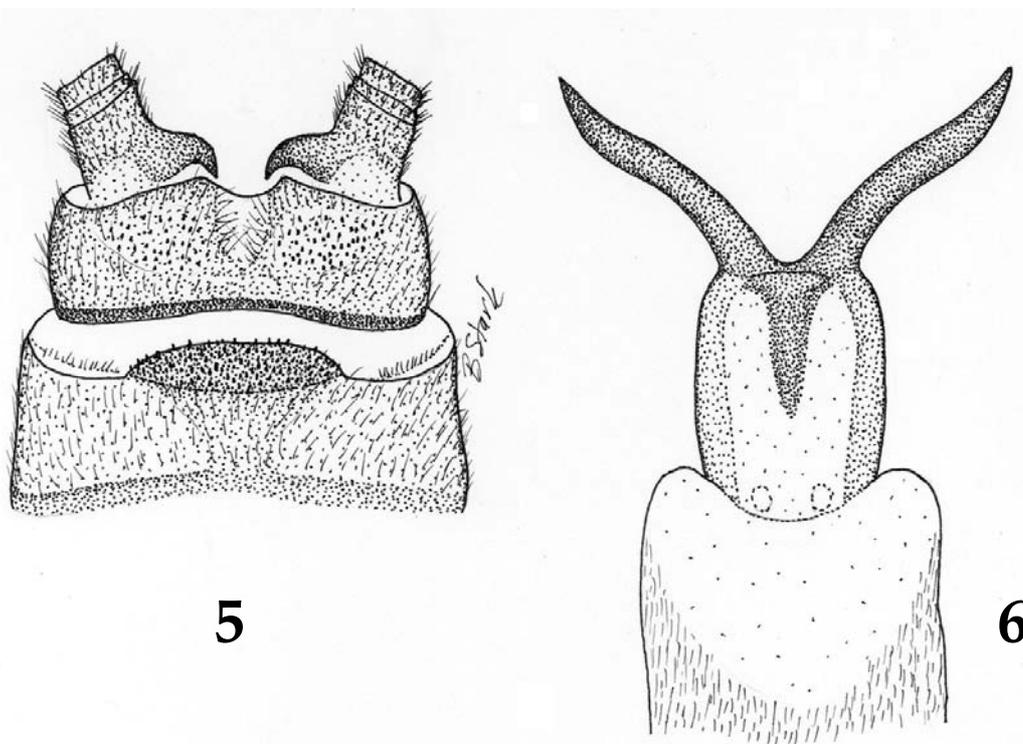
(Figs. 5-6)

**Material examined.** Holotype ♂ (pinned) from China, Szechuan [Sichuan] Province, Mt. Omei [Emei

Shan], July 1936, D.C. Graham (USNM).

**Adult habitus.** Triocellate. General color pattern pale brown but details obscured due to specimen condition. Ocellar triangle covered with dark pigment but most of head apparently pale brown. Wings pale, veins yellow brown. Femora yellow brown, tibiae slightly darker.

**Male.** Forewing length 21 mm. Tergum 9 produced along posterior margin into a small lobe projecting over base of tergum 10; lobe densely armed with prominent sensilla basiconica. Tergum 10 with sensilla basiconica patches separated by posterior incursion of U-shaped membranous area (Fig. 5). Paraproct tips small, acute and darkly sclerotized. Hammer present on sternum 9. Aedeagus armed with massive Y-shaped sclerite with long projecting horns and short stem; lateral aspect of apical aedeagal section with narrow supporting sclerites. Basal section of aedeagus membranous but armed with a band of brown, setal spines across ventrobasal area (Fig. 6).



Figs. 5-6. *Sinacroneuria bicornuata*. 5. Male terminalia, 6. Aedeagus, ventral aspect.

**Female.** Unknown.

**Larva.** Unknown.

**Etymology.** The species name is based on the prominent aedeagal horns.

**Diagnosis.** This species appears to be distinct from others on the basis of the large horn-like aedeagal sclerite with short Y-stem, the basal, aedeagal, setal spine patch, and the small, projecting mesal lobe on tergum 9. The holotype specimen bears a determination label of "*Acroneuria yiui* (Wu)" by Nathan Banks, but that species lacks the lobe on tergum 9 (Wu 1935; Yang & Yang 1998), and the aedeagus lacks the Y-shaped sclerite of this species (Yang & Yang 1998). The type specimen was previously studied by the senior author in 1974 and at that time, the aedeagus was fully everted and drawn but a decision was made to wait for fresh material before publication. Now, more than 34 years later, we proceed in order to continue the documentation of the diverse and interesting Asian stonefly fauna.

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#### REFERENCES

- Du, Y., I. Sivec & J. He. 1999. A checklist of the Chinese species of the family Perlidae (Plecoptera: Perloidea). *Acta Entomologica Slovenica*, 7:59-67.
- Uchida, S. 1990. A revision of the Japanese Perlidae (Insecta: Plecoptera), with special reference to their phylogeny. Unpublished PhD Dissertation. Tokyo Metropolitan University. 228 pp.
- Wu, C.F. 1935. New species of stoneflies from east and south China. *Bulletin of the Peking Society of Natural History*, 9:227-243.
- Yang, C. & D. Yang. 1995. A new genus and new species of Plecoptera from east China (Perlidae: Acroneuriinae). *Entomological Journal of East China*, 4:1-2.
- Yang, D. & C. Yang. 1998. Plecoptera: Styloperlidae, Perlidae, and Leuctridae. *Insects of Longwangshan*, 8:40-46.

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