



## TWO NEW *PROTONEMURA* SPECIES FROM VIETNAM (PLECOPTERA: NEMOURIDAE)

Ignac Sivec<sup>1</sup> and Bill P. Stark<sup>2</sup>

<sup>1</sup> Slovenian Museum of Natural History, Prešernova 20, P.O. Box 290, SLO-1001 Ljubljana, Slovenia  
E-mail: [isivec@pms-lj.si](mailto:isivec@pms-lj.si)

<sup>2</sup> Box 4045, Department of Biology, Mississippi College, Clinton, Mississippi, U.S.A. 39058  
E-mail: [stark@mc.edu](mailto:stark@mc.edu)

---

### ABSTRACT

*Protonemura fansipanensis* sp. n. and *P. neofiligera* sp. n. are recognized as the first representatives of the genus known from Vietnam. The new species are compared with regional members of the genus.

**Keywords:** *Protonemura*, Plecoptera, Nemouridae, Vietnam, new species

---

### INTRODUCTION

The genus *Protonemura* currently includes 124 species known mainly from the western European/North African regions (DeWalt et al. 2009), and also exhibits significant diversity in the Caucasus and Middle Eastern regions (Baumann 1975; DeWalt et al. 2009). Oriental and eastern Palearctic diversity is lower with twelve species recognized from Japan (Shimizu 1998), five from China (Du et al. 2007; Li & Yang 2008; Wu 1949), and only one is reported for southeast Asia (Thailand) by Kawai (1969). Additional Asian species are recorded from Assam (Kimmins 1950), Korea (Ham & Lee 1999) and Nepal (Harper 1974). In this study, we report the occurrence of two new *Protonemura* species collected in the mountains of northern Vietnam. Specimens are deposited in the Royal Ontario Museum, Toronto (ROM) or the Zoological Museum der Universität-Humboldt, Berlin (ZMB).

### RESULTS AND DISCUSSION

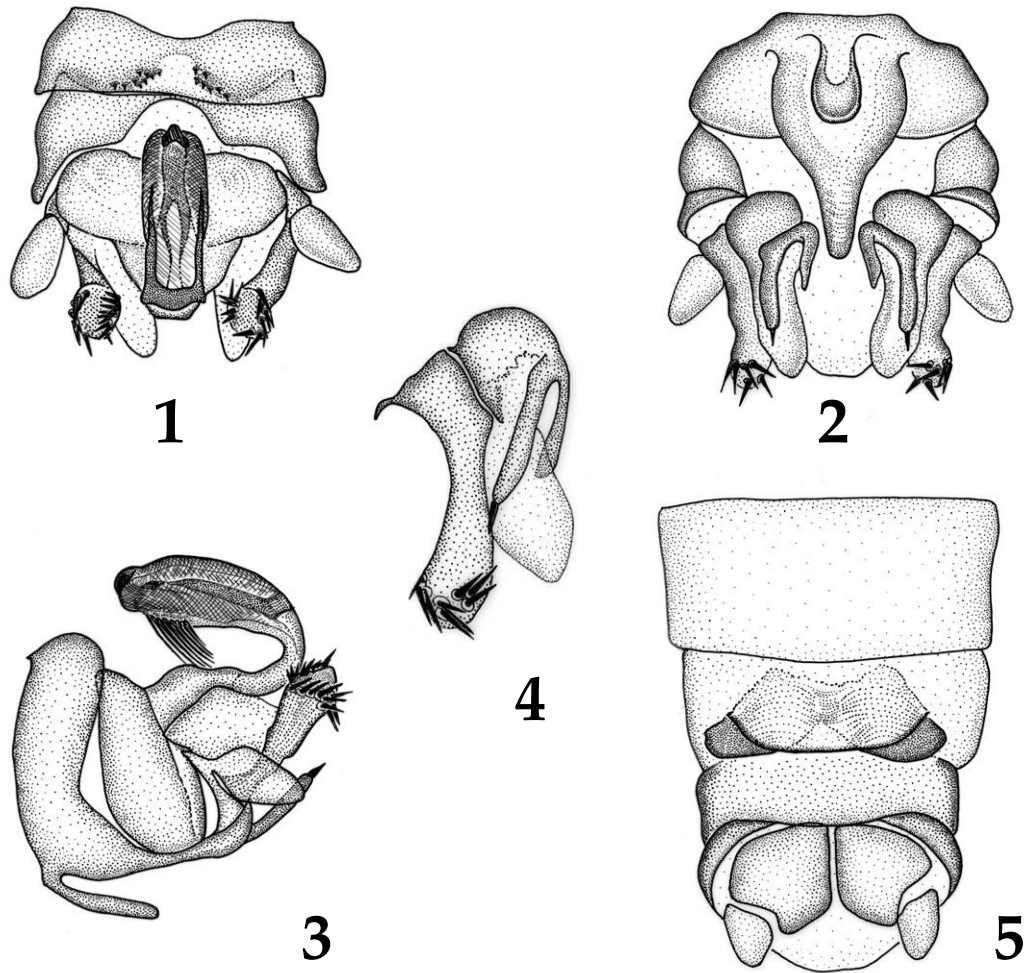
*Protonemura fansipanensis* sp. n.

(Figs. 1-5)

**Material examined.** Holotype ♂ and 1 ♀ paratype collected in Sapa, Fan Si Pan Mountains, Lao Cai Province, Vietnam, 25-30 March 1995, W. Mey (ZMB).

**Adult habitus.** General color dark brown to black. Head nearly black, antennae uniformly dark brown, palpi paler. Legs generally pale brown but hind femora distinctly banded, and proximal and distal ends of tibiae darker. Pronotum uniformly brown without conspicuous sculpturing.

**Male.** Forewing length 8 mm. Abdominal tergum 9 deeply emarginate mesally, but without conspicuous setation; tergum 8 bearing a pair of thick spines on either side of a mesal membranous area (Fig. 1). Epiproct lateral margins subparallel in dorsal aspect for most of length; apex slightly projecting (Fig. 1); ventral margin in lateral aspect relatively straight, but bearing a subterminal cluster of long thin spines (Fig. 3); apex slightly narrowed along dorsal margin. Inner lobe of paraprocts short, slender and without apical setation; mesal lobe slender and bearing an apical spine; outer lobe relatively large, somewhat swollen apically and bearing a cluster of ca. 9 prominent spines (Figs. 1-4). Vesicle about twice as long as wide (Fig. 2).



Figs. 1-5. *Protonemura fansipanensis*. 1. Male terminalia, dorsal. 2. Male terminalia, ventral. 3. Male terminalia, lateral. 4. Male paraprocts. 5. Female terminalia, ventral.

**Putative Female.** Forewing length 9 mm. Subgenital plate scarcely projecting beyond posterior margin of sternum 8 (Fig. 5); sternum 8 with strongly divergent, pigmented vaginal lobes underlying subgenital plate. Pregonital plate absent.

**Larva.** Unknown.

**Etymology.** The species name is based on Fan Si Pan (Phan Xi Päng) Mountain, from which it was collected.

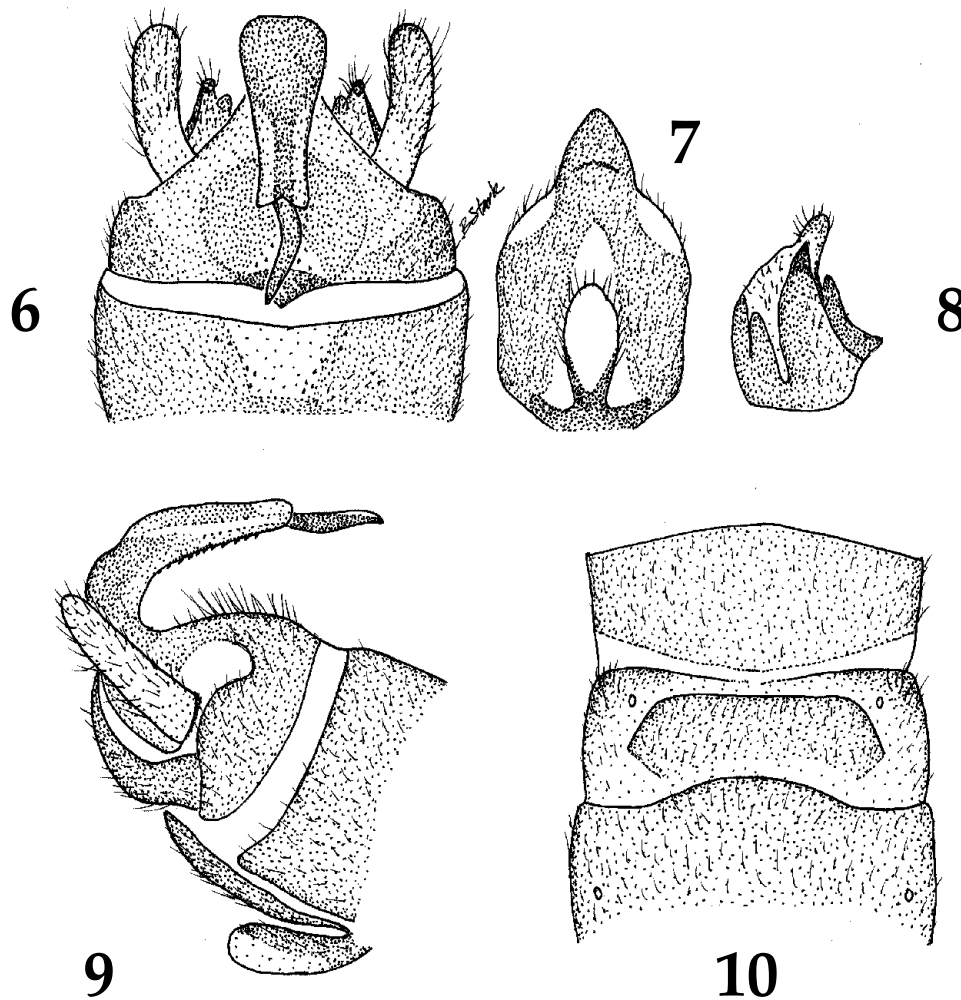
**Diagnosis.** See below for *P. neofiligera*.

*Protonemura neofiligera* sp. n.

(Figs. 6-10)

**Material examined.** Holotype ♂ and female ♀ from 12 km along road from Sapa to Lai Chau, 1950 m, 22° 20.58' N, 103° 40.15' E, Lao Cai Province, Vietnam, 1-12 May 1999, ROM 992012, B. Hubley (ROM).

**Adult habitus.** General color dark brown. Head dark brown, antennae brown. Pronotum brown but paler along lateral margins. Fore femora uniformly brown, mid femora with obscure pale mesal band, hind femora distinctly banded at midlength; hind tibiae dark in distal half. Wings dark brown. Gills finger-like, plump; outer gill branched near base, inner gill single.



Figs. 6-10 . *Protonemura neofiligera*. 6. Male terminalia, dorsal. 7. Male hypoproct and vesicle, ventral. 8. Male left paraproct, ventrocaudal. 9. Male terminalia, lateral. 10. Female sterna 7-9, ventral.

**Male.** Forewing length 8.5 mm. Abdominal tergum 9 membranous in mesal third and bearing a few scattered sensilla basiconica along margins of membranous area (Fig. 6); tergum 8 unmodified. Epiproct slightly broader at base than tip, apex notched and bearing a short, dextrally curved filament-like process protruding from internal sheath (Figs. 6, 9); ventrolateral aspect of epiproct with a double row of small spines; slightly bulbous, dorsolateral, membranous zone covered with fine scale-like structures visible in lateral aspect (Fig. 9). Inner lobe of paraprocts partially divided from tip by thin dark line (Fig. 8); mesal lobe larger than others and bearing a terminal, setose knob-like dorsal

structure and an acute sclerotized ventroapical point; outer lobe small but sclerotized, and lying along outer margin of mesal lobe. Vesicle about twice as long as wide, sclerotized near base but membranous over most of length (Fig. 7); hypoproct apex somewhat hastate (Fig. 7).

**Female.** Forewing 8.5 mm. Pregenital plate on sternum 7 overlapping base of sternum 8 (Fig. 10); subgenital plate on sternum 8 truncate or slightly rounded and not reaching posterior margin of segment.

**Larva.** Unknown.

**Etymology.** The species name represents an emendation of Kawai's (1969) species name *filigera*

and several of Aubert's (1967) species names (e.g. *brachyfiligera*, *metafiligera*, *parafiligera*, *pseudofiligera*) originally proposed as species of *Protonemura*, but placed in *Mesonemoura* by Baumann (1975).

**Diagnosis.** The epiproct and paraproct structures are very different for the three southeast Asian *Protonemura* species. *Protonemura filigera* Kawai, the species known from Thailand, has an odd, posteriorly directed dorsal filament and a pair of small comb-shaped subapical structures on the epiproct (Kawai 1969) that neither of the Vietnamese species possess. The two Vietnamese species are quite different in paraproct structure with *P. fansipanensis* having several stout setal-like spines on the large outer lobe (Fig. 4), whereas in *P. neofiligera* the outer lobe is small and the larger mesal lobe has only setae on the tips (Fig. 8). In addition, the epiproct of *P. neofiligera* has a prominent, anteriorly directed, apical filament (Figs. 6, 9) which is absent in *P. fansipanensis*. Females of the two new species are distinguished on the basis of the pregenital plate on sternum 7, present in *P. neofiligera* (Fig. 10) and absent in *P. fansipanensis* (Fig. 5).

#### ACKNOWLEDGMENTS

We thank W. Mey and the Zoological Museum der Universität-Humboldt, Berlin, and B. Hubley and the Royal Ontario Museum, Toronto, for the loan of these interesting specimens.

#### REFERENCES

- Aubert, J. 1967. Les Nemouridae de l'Assam (Plécoptères). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 39:209-253.
- Baumann, R.W. 1975. Revision of the stonefly family Nemouridae (Plecoptera): A study of the world fauna at the generic level. *Smithsonian Contributions to Zoology*, 211:1-74.
- DeWalt, R.E., U. Neu-Becker & G. Steuber. 2009. Plecoptera species file online. Version 1.1/3.5 [20 July 2009]. <http://Plecoptera.SpeciesFile.org>.
- Du, Y., Z. Wang & P. Zhou. 2007. Two new species of *Protonemura* (Plecoptera: Nemouridae) from China. *Aquatic Insects*, 29:97-102.
- Ham, S.A. & J.B. Lee. 1999. Four new species of Nemouridae (Plecoptera: Insecta) from Korea. *Korean Journal of Biological Sciences*, 3:119-125.
- Harper, P.P. 1974. New *Protonemura* (s.l.) from Nepal

- (Plecoptera: Nemouridae). *Psyche*, 81:367-376.
- Kawai, T. 1969. Stoneflies (Plecoptera) from Southeast Asia. *Pacific Insects*, 11:613-625.
- Kimmins, D.E. 1950. Some new species of Asiatic Plecoptera. *The Annals and Magazine of Natural History, Series 12*, 3:177-210.
- Li, W. & D. Yang. 2008. New species of Nemouridae (Plecoptera) from China. *Aquatic Insects*, 30:205-221.
- Shimizu, T. 1998. The genus *Protonemura* in Japan (Insecta: Plecoptera: Nemouridae). *Species Diversity*, 3:133-154.
- Wu, C.F. 1949. Sixth supplement to the stoneflies of China (Order Plecoptera). *Bulletin of the Peking Society of Natural History*, 17:251-256.

Received 11 December 2009, Accepted 29 December 2009, Published 31 December 2009