



## SWELTSA WUI AND HAPLOPERLA VALENTINAE (PLECOPTERA: CHLOROPERLIDAE), TWO NEW STONEFLIES FROM SICHUAN PROVINCE, CHINA

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### ABSTRACT

*Sweltsa wui* sp. n. and *Haploperla valentinae* sp. n. are described from Balangshan Pass, Sichuan Province, and compared with known Asian species. The new *Sweltsa* species lacks a transverse process on tergum nine, an atypical character for this genus, and the posterior margin of male tergum nine is not strongly concave as in other *Sweltsa* species, consequently the generic assignment is considered tentative.

**Keywords:** *Sweltsa*, *Haploperla*, Plecoptera, Chloroperlidae, China, New species

### INTRODUCTION

Wu (1938) described three chloroperlids from Gansu Province, China which he placed in genus *Alloperla*, and Nelson & Hanson (1968) added two Manchurian species, *A. thompsoni* and *A. alexanderi*. The latter species is now considered a synonym of *A. mediata* (Navas) (Zhiltzova & Zwick 1971), and two of Wu's (1938) *Alloperla* have subsequently been placed in *Sweltsa*. This appears to be a valid assignment for *A. longistyla* Wu, which has a transverse process on male tergum 9, but figures of *A. recurvata* Wu do not indicate the presence of this structure and consequently, it's generic assignment is less secure. The epiproct of the other Wu (1938) species, *A. erectospina* Wu, appears to be more consistent with genus *Haploperla* or *Plesioperla* (Zwick 1967). Thus among Chinese chloroperlids, *Alloperla mediata* and *A. thompsoni* appear to be correctly placed in *Alloperla*, *Sweltsa longistyla* appears to be correctly placed but *Alloperla recurvata* and *A. erectospina* require additional study in order to determine the proper generic assignment. Beyond these five species, *Haploperla lepnevae* Zhiltzova & Zwick and *H. ussurica* Navas are the only chloroperlid species

reported for China (Zhiltzova & Zwick 1971; Zwick 1973).

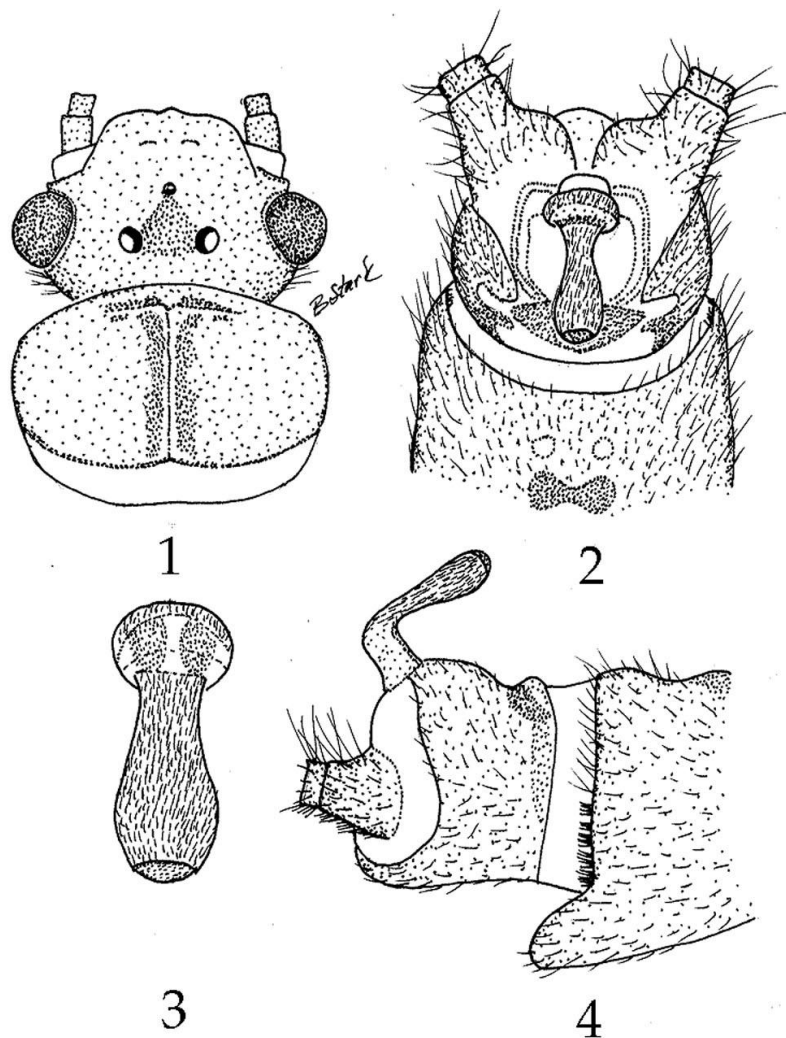
### RESULTS AND DISCUSSION

In this study, we report the presence of two new chloroperlid species from Balangshan Pass, Sichuan Province, a site considerably south of other localities from which Chinese chloroperlids have been collected, although a few chloroperlid species are reported for Assam (Zwick 1967) and Thailand (Stark & Sivec 2008). One species is similar in color pattern to *Sweltsa colorata* Zhiltzova & Levanidova [now considered a synonym of *S. nikkoensis* (Okamoto) Kim et al. 1998] and *S. insularis* Zhiltzova, a species described in Zhiltzova & Levanidova (1978). One of these species [*S. insularis*] lacks a transverse abdominal bar, similar to the structure found in most *Sweltsa*, and also differs significantly in color pattern from Nearctic *Sweltsa*. Because this species (and possibly *A. recurvata*), and one we are describing below, might belong to an unrecognized genus, we studied epiprocts of a few previously named Asian *Sweltsa* with SEM in order to assist in determining

the generic assignment of the new species.

The new *Haploperla* species is generally similar to *H. lepnevae* in color pattern (Zhiltzova & Zwick 1971), but the epiproct tip is more rounded. We hope this small contribution will encourage our colleagues to

search for additional representatives of Asian Chloroperlidae. Specimens are deposited in the Slovenian Museum of Natural History, Ljubljana (PMSL) and the Stark Collection, Mississippi College, Clinton (BPS).



Figs. 1-4. *Sweltsa wui*. 1. Head and pronotum. 2. Male terminalia, dorsal. 3. Epiproct, dorsal. 4. Male terminalia, lateral.

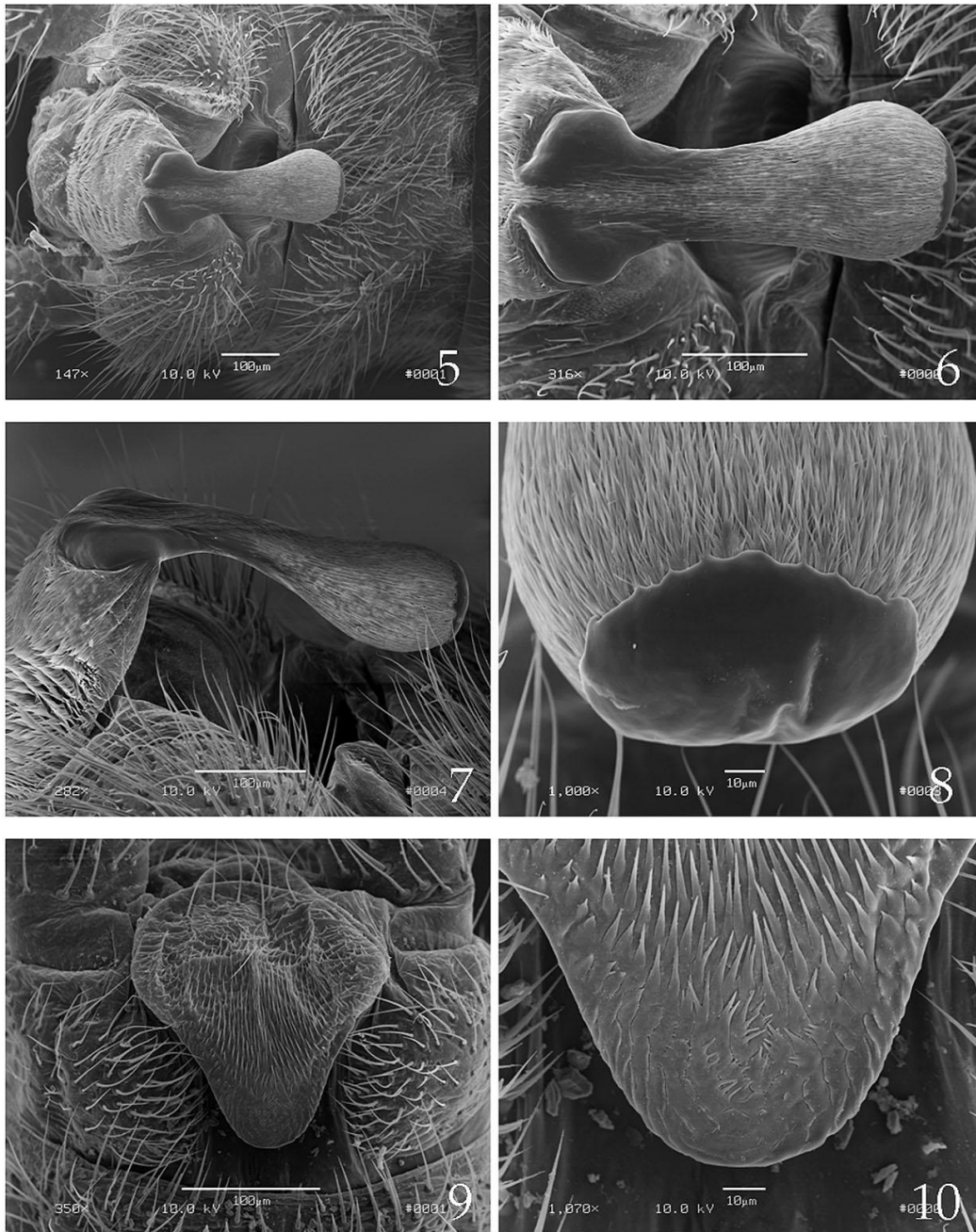
*Sweltsa wui* sp. n.  
(Figs. 1-8)

**Material examined.** Holotype ♂ and 3 ♂ paratypes from China, Sichuan Province, Pitiao River, Welong, Balangshan Pass, 2700-4000 m, 1-4 June 1991, B. Horvat & I. Sivec (PMSL, 1 paratype-BPS).

**Adult habitus.** General color pale yellow in alcohol but with a distinctive, narrowly divided, median, pronotal band (Fig. 1) and obscure interocellar brown

spot; meso and metathoracic notae with dark brown U-patterns, and abdomen bearing a continuous brown longitudinal band on segments 1-8; tergum 9 with a small, basal dumbbell shaped brown spot. Wings transparent, legs pale.

**Male.** Forewing length 9.5 mm. Tergum 9 without transverse process and without median excavation on posterior margin (Figs. 5-6). Epiproct about 2.5 X longer than basal width, rod-like but with lateral margins slightly constricted from near base to apical



Figs. 5-10. Scanning electron micrographs of male genitalia. *Sweltsa wui* (5-8). 5. Terminalia, dorsal. 6. Epiproct, dorsal. 7. Epiproct, lateral. 8. Epiproct surface detail, frontal aspect. *Haploperla valentinae* (9-10). 9. Terminalia, dorsal. 10. Epiproct, dorsoapical margin.

third. Epiproct length ca. 343 µm, subapical width ca. 129 µm, basal width ca. 138 µm, width at narrowest point ca. 71 µm. Epiproct apex a smooth, sclerotized cap but most of dorsal and ventral surface covered

with golden brown, closely appressed setae (Figs. 2-4, 5-8); base with dorsal and lateral bare areas (Figs. 6-7). Epiproct apex slightly inflated in lateral aspect (Figs. 4, 7).



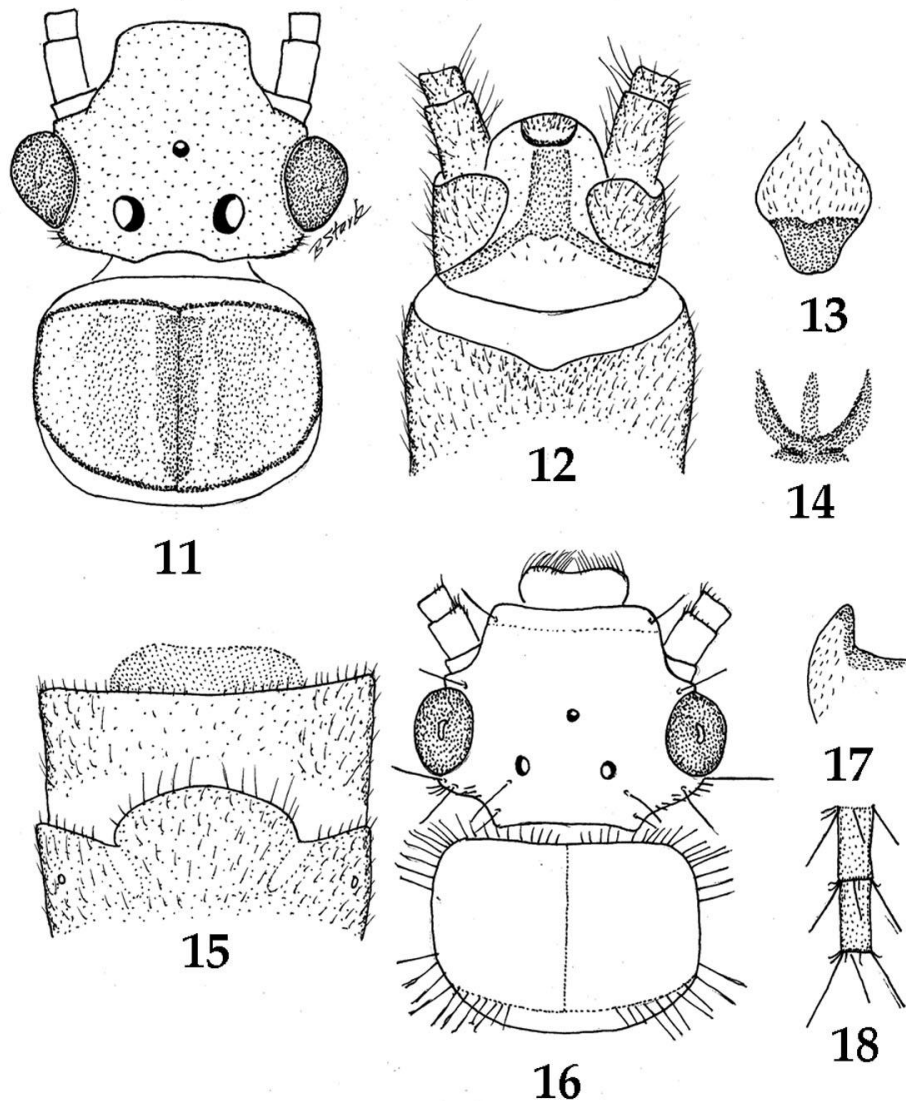
**Female.** Unknown.

**Larva.** Unknown.

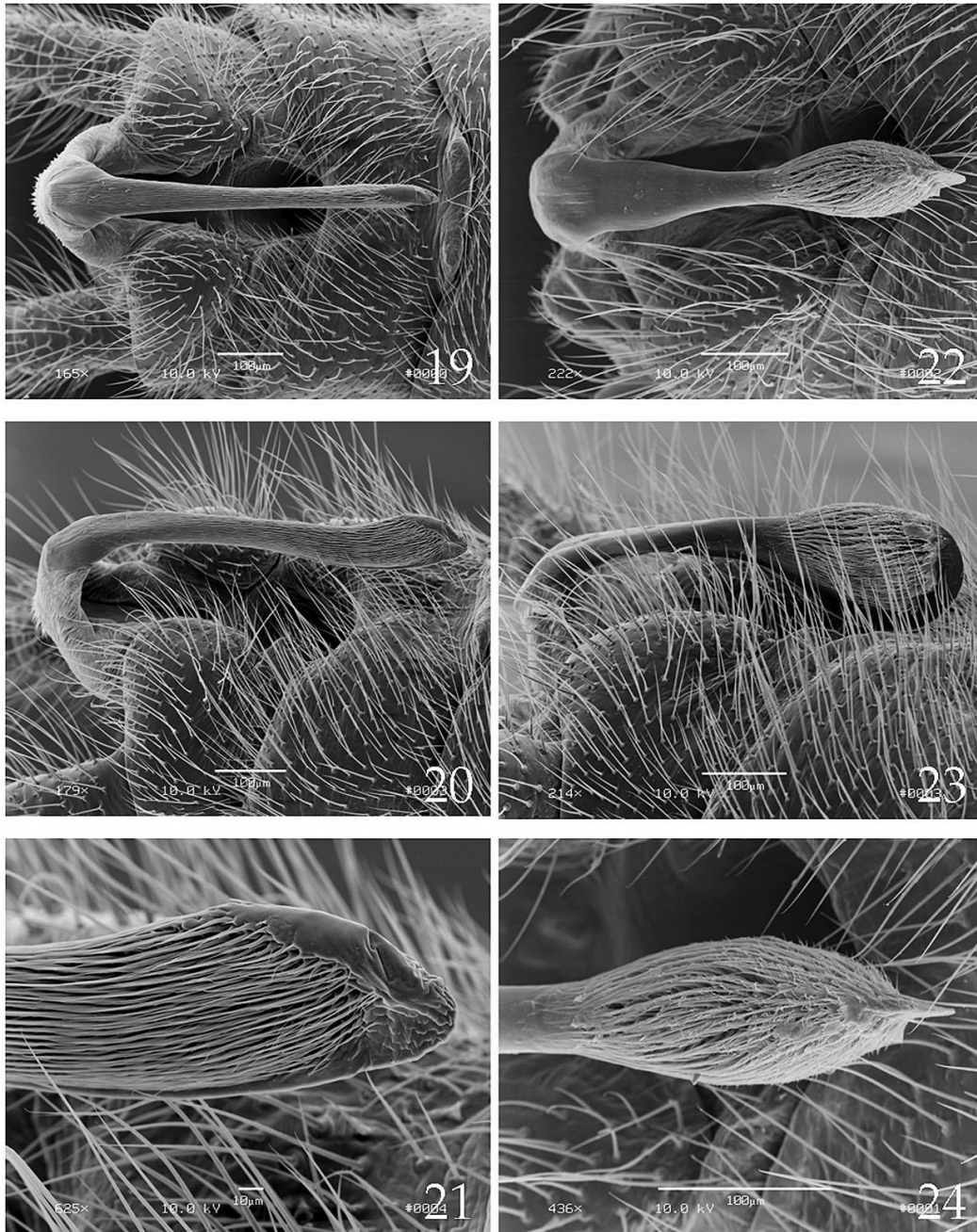
**Etymology.** We dedicate this species to the late Professor Dr. C.F. Wu in recognition of his enormous contribution to the knowledge of Chinese Plecoptera.

**Diagnosis.** This species is similar in pronotal pigment pattern to *Sweltsa insularis* (Zhil'tzova & Levanidova 1978), *S. nikkoensis* (Okamoto) (Ham

2008), and also to the Japanese species *S. abdominalis* (Okamoto) and *S. sapporoensis* (Okamoto), however the general shape and setal pattern of the epiproct is different among these species [except *S. sapporoensis* (Figs. 22-24) and *S. nikkoensis* (Figs. 25-27) which are quite similar]. *Sweltsa wui* is the only known Asian species in which the epiproct apex is as wide as, or wider than, the base (Figs. 5-6).

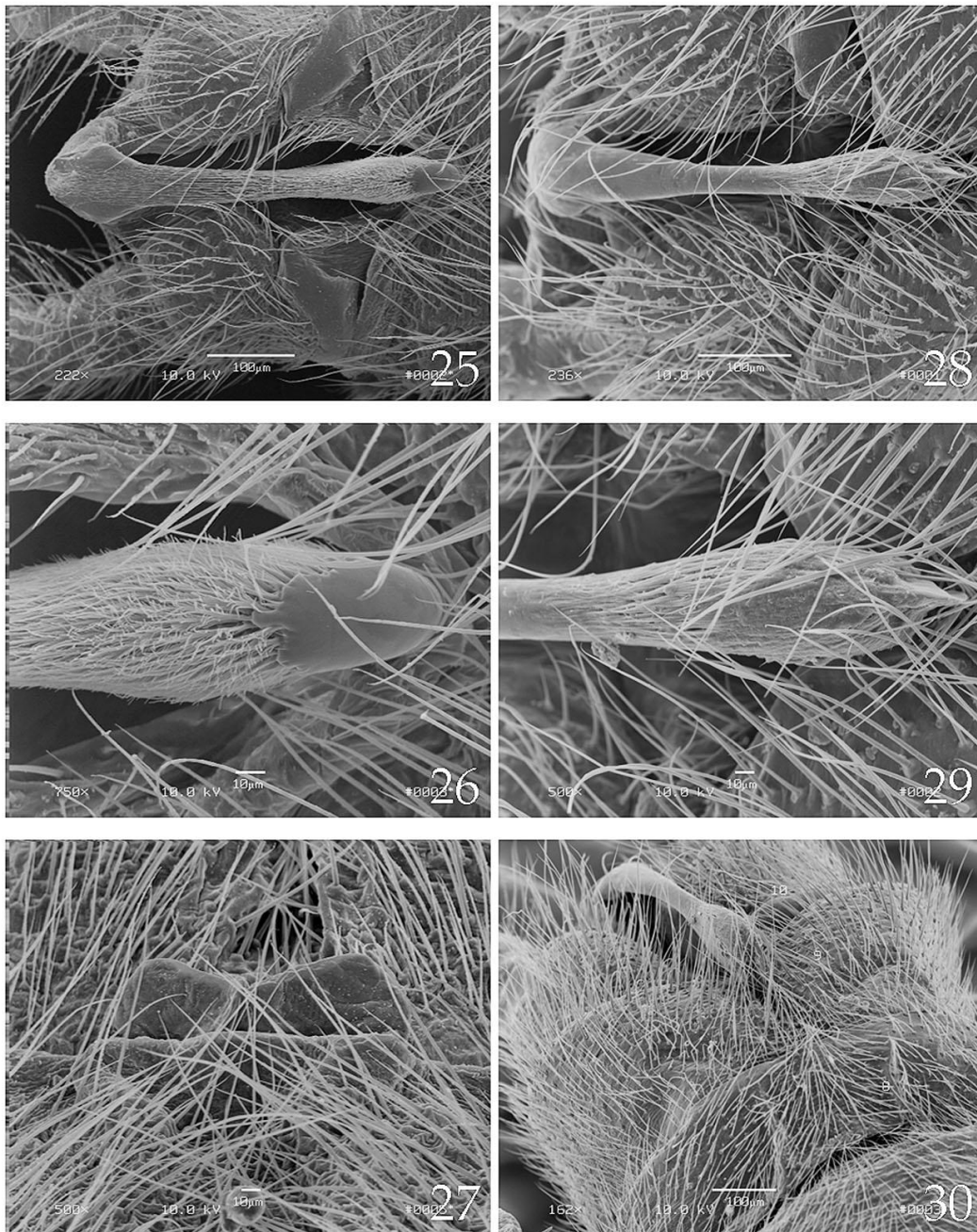


Figs. 11-18. *Haploperla valentinae*. 11. Adult head and pronotum. 12. Male terminalia, dorsal. 13. Epiproct, dorsal. 14. Metanotal U-suture. 15. Female sterna 8-9. 16. Larval head and pronotum. 17. Epiproct, lateral. 18. Larval cercal segments 9-10, lateral.



Figs. 19-24. Scanning electron micrographs of male genitalia. *Sweltsa abdominalis*, Japan, Yoki-zawa, Yamakita-machi, Kanagawa, 10 May 1996, T. Shimizu, (19-21). 19. Male terminalia, dorsal. 20. Epiproct, lateral. 21. Epiproct apex, lateral. *Sweltsa sapporoensis*, streamlets along Tottabetsu-gawa stream, Obihiro City, Hokkaido, Japan, 16 June 1992, T. Shimizu (22-24). 22. Male terminalia, dorsal. 23. Epiproct, lateral. 24. Epiproct apex, dorsal.





Figs. 25-30. Scanning electron micrographs of male genitalia. *Sweltsa nikkoensis*, Russia, p. Kedrovaja, Zapovednik Kedrovaja Pad, 14 May 2002, V. Teslenko det. (25-27). 25. Male terminalia, dorsal. 26. Epiproct apex, dorsal. 27. Male 9<sup>th</sup> tergal process. *Sweltsa insularis*, Russia, o. Sahalin, p. Belaja, sb. Makarchenko, 29 June-7 July 1986, V. Teslenko det. (28-30). 28. Male terminalia, dorsal. 29. Epiproct apex, dorsal. 30. Male terminalia, oblique dorsolateral.

The species of genus *Sweltsa* are quite variable in epiproct structure and several species complexes in the group may at some time be given generic rank. The structure of tergum 9 in *S. wui* suggests it could be placed in another genus. A few, unrelated Nearctic species are also known to lack the transverse process (Kondratieff & Baumann 2009), but these species have the posterior margin of tergum 9 strongly concave as in other Nearctic members of the genus. Our study of Asian *Sweltsa* indicates two Japanese species, *S. abdominalis* (Figs. 19-21) and *S. sapporoensis* (Figs. 22-24) share the tergum 9 modifications with Nearctic members of the group but also share a similar color pattern with *S. wui*. In addition, *S. insularis*, a similarly pigmented Russian species, also lacks the tergal 9 modification (Figs. 28-30), but *S. colorata* (= *S. nikkoensis*), another Russian species with similar pigment, has a well developed process on tergum 9 (Figs. 25-27). Consequently, in the absence of data from other life stages, we are tentatively placing the new species in genus *Sweltsa*.

*Haploperla valentinae* sp. n.  
(Figs. 9-18)

**Material examined.** Holotype ♂, 3 ♂ and 5 ♀ paratypes from China, Sichuan Province, Pitiao River, Balangshan Pass, 2700-4000 m, 1-4 June 1991, H.B., I. Sivec (PMSL, 1 paratype-BPS). Additional specimen: Type locality, same collecting data, 1 larva (PMSL).

**Adult habitus.** General color pale yellow patterned with pale brown. Pronotum bearing an obscure pale brown, median band, meso and metanotae dark brown U-patterns with a strong mesal prong (Figs. 11, 14). Abdomen with a median longitudinal brown band from segments 1-8, but terga 1 and 8 with brown areas reduced to small anterior spots; brown areas on terga 2-7 cover most of tergal length but include a pair of small, circular pale areas on each segmental band. Legs and wings pale.

**Male.** Forewing length 6 mm. Tergum 9 without posterior lobe, but bearing a mesal patch of short, thick setae (Fig. 12). Epiproct short, length ca. 186 µm and about as wide as long (Figs. 9, 12); outline subtriangular with rounded margin in dorsal aspect; margin strongly sclerotized but posterodorsal area membranous and clothed with sparse patch of short, brown setae (Figs. 9-10, 13, 17).

**Female.** Forewing length 7 mm. Subgenital plate slightly produced as a small rounded lobe clothed with long setae (Fig. 15). Intersegmental area posterior to sternum 9 bearing a large median microtrichia patch.

**Larva.** Body length ca. 7 mm. General color brown, pattern questionable due to pharate adult features. Pronotum bearing well developed setal rows on anterior and posterior margins, but interrupted on lateral margins leaving a large gap (Fig. 16). Cerci with ca. 12 segments; each segment with prominent dorsal and ventral seta in lateral aspect (Fig. 18).

**Etymology.** The species name honors Dr. Valentina Teslenko, Vladivostok for her numerous contributions to the knowledge of Plecoptera.

**Diagnosis.** *Haploperla lepnevae* and *H. ussurica*, the two species reported from China, both have triangular epiprocts with narrow tips (Zhiltzova & Zwick 1971) and *H. zwicki* Stark & Sivec, known from Thailand, has a much more distinctly pigmented pronotal disk than the new species.

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