Zootaxa 4674 (4): 463–470
https://www.mapress.com/j/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.4674.4.5
http://zoobank.org/urn:lsid:zoobank.org:pub:7A8FAF41-8A15-43AC-8176-552BC3E609C4

A new species of *Capnia* (Plecoptera: Capniidae) from Lesser Khingan Range (Amur River Basin, Far East of Russia)

VALENTINA A. TESLENKO
Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far Eastern Branch, Russian Academy of Sciences (FSC EATB FEB RAS), Vladivostok, 690022, Russia
E-mail: teslenko@biosoil.ru

Abstract

Capnia khingana **sp. n**. (Plecoptera: Capniidae) is described as a new brachypterous species from the Lesser Khingan Range south of the Far East of Russia. Detailed descriptions and illustrations are provided for both sexes. According to the diagnostic characters of the male epiproct, *C. khingana* **sp. n**. may be tentatively assigned to the C. *atra* species group.

Key words: Plecoptera, *Capnia khingana* **sp. n.**, Lesser Khingan, Amur River Basin, Far East, Russia

Introduction

Capnia Pictet, 1841 is the most species rich genus of the Capniidae. Murányi *et al.* (2014) provided a comprehensive revision of the Nearctic and West Palaearctic genera of the family and *Capnia* currently includes about 100 species (DeWalt *et al.* 2019) in the world. Fifteen species of *Capnia* have been recorded from the Russian Far East (Zhiltzova 2003). Among them, *C. ahngeri* Koponen, 1949 (in Koponen & Brinck 1949), *C. aligera* Zapekina-Dulkeit, 1975a, *C. nearctica* Banks, 1918, *C. nigra* (Pictet, 1833), *C. pygmaea* Zetterstedt, 1840 fit the concept of *Capnia* sensu stricto (Muranyi *et al.* 2014). The remaining species, *C. potikhae* Zhiltzova, 1996 (in Potikha & Zhiltzova 1996), *C. iturupiensis* Zhiltzova, 1980, *C. sidimiensis* Zhiltzova, 1979, *C. levanidovae* Kawai, 1969, *C. kolymensis* Zhiltzova, 1981, C. *kurnakovi* Zhiltzova, 1978, *C. lepnevae* Zapekina-Dulkeit, 1960, *C. bargusinica* Zapekina-Dulkeit, 1975a, *C. rara* Zapekina-Dulkeit, 1970, and *C. tshukotica* Zhiltzova & Levanidova, 1978 are considered as taxa of *Capnia* sensu lato. Below is a description of a remarkable new *Capnia* species, *C. khingana* **sp. n.** from the tributaries of the upper reaches of the Mutnaya River that flow down from the spurs of the Lesser Khingan Mountains into the Amur River.

Material and methods

Adults were hand collected with entomological forceps from the surface of ice and snow and preserved in 75% ethanol. Abdomens of adults were removed and soaked in 10% NaOH overnight and rinsed with distilled water. Specimens were examined with the aid of a compound microscope in transmitted light. Illustrations were produced using digital cameras (Nikon Coolpix 995 and Toup View 3.7) and with the stereomicroscope Olympus SZX1 6 and digital camera Olympus DP74, and stacked using Helicon Focus software. The final illustrations were post-processed for contrast and brightness using Adobe® Photoshop® software. Photographs were taken in the Federal Scientific Center of the East Asia Terrestrial Biodiversity, Far Eastern Branch, Russian Academy of Sciences, Vladivostok, Russia (FSC EATB FEB RAS). The type series, holotype and all paratypes are deposited in the collection of the FSC EATB FEB RAS. Terminology of species description follows Nelson & Baumann (1989) and Murányi *et al.* (2014).

Accepted by B. Kondratieff: 2 Sept. 2019; published: 26 Sept. 2019

Results and discussion

Capnia khingana Teslenko sp. n.

(Figs 1–10)

urn:lsid:zoobank.org:act:047CF86B-8445-424C-BC3D-3E1ED69E4DB8

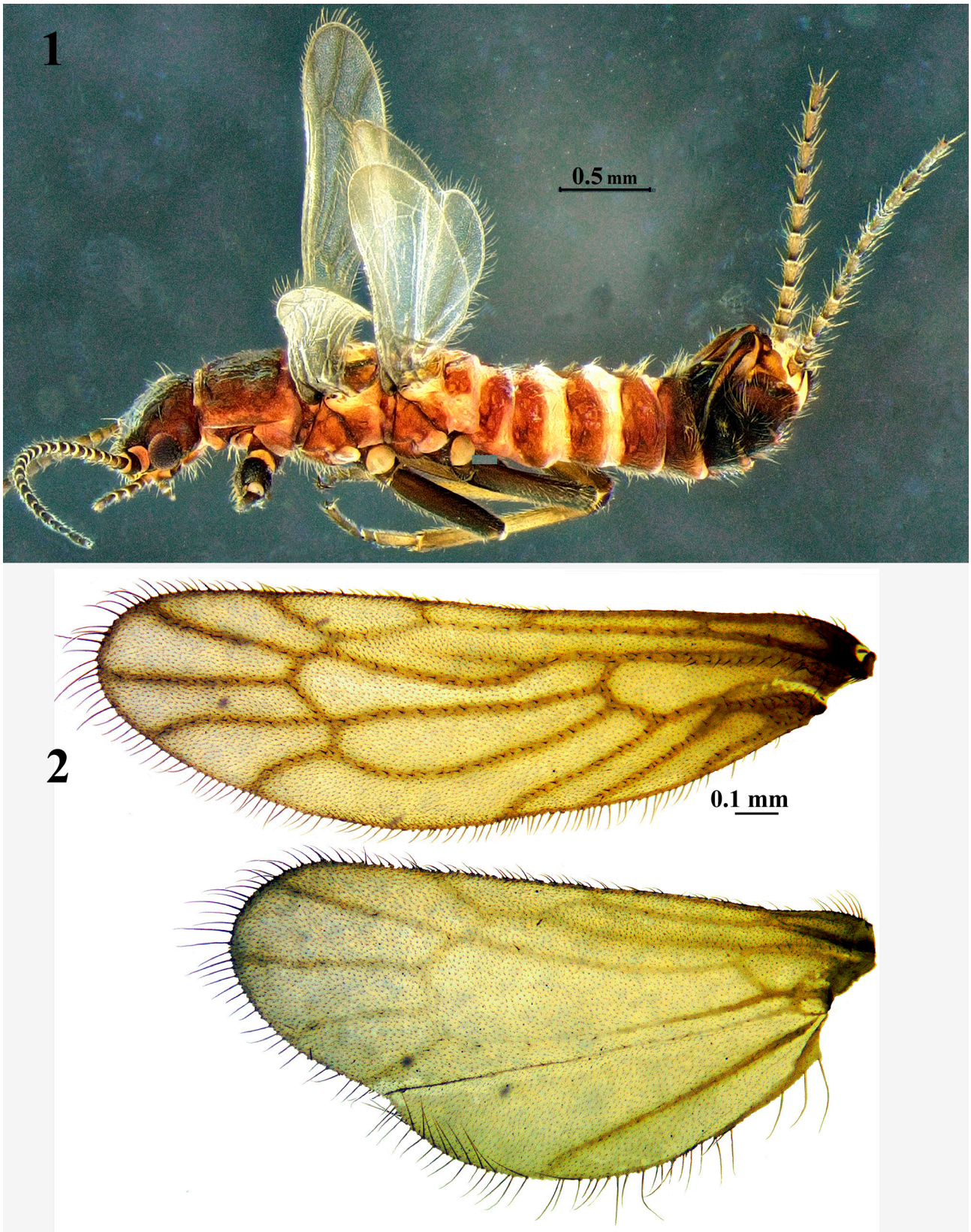
Material examined. Holotype male: Amurskaya oblast', Khinganskiy State Nature Reserve (KSNR), Olochi River, upstream, 49°06.559 N 130°39.222 E, Mutnaya R. Basin, Amur River Basin, 14.03.2018, coll. I. Balan & D. Kochetkov (FSC EATB FEB RAS). Paratypes: 15 males, 21 females, the same locality and date (FSC EATB FEB RAS). Additional material: 5 males, 5 females, Amurskaya oblast', KSNR, Eracta River, upstream, 49°05.571 N 130°35.465 E, Mutnaya River Basin, Amur River Basin, 16.03.2018, coll. I. Balan & D. Kochetkov; 18 males, 9 females, Amurskaya oblast', KSNR, Pereval'nyi Stream, upstream of Olochi River, 49°07.155 N 130°40.126 E, 13.03.2018, coll. I. Balan & D. Kochetkov.

Description. General color brown, darkly sclerotized (Figs. 1, 3-6). Wings brachypterous, hyaline, covered with tiny dark setae; margins brownish with long colorless bristles, the longest bristles arranged along edges of the radial and anal fields (Fig. 2). Forewing brownish and darker than hindwing, veins dark brown and with small black setae evenly distributed along entire length of the crossveins. *R1* of forewing typical of *Capnia*, bent upward at its origin; *1A* slightly curved at its junction with *cu-a*. Hind wing mostly pale, veins slightly brownish, weakly recognisable, with sparse small black setae; but *R*, trace of *Cu* and three *A* veins are visible (Fig. 2). Palpi, head, pronotum, meso- and metanotum, legs dark brown. Mesothoracic sclerite (Fig. 3) from ventral view features with narrow spinasternum, not fused with prothoracic postfurcasternum (PPfs) and large basisternum (Bs); presternum (Prs) median-sized, elliptical, not fused with basisternum; furcasternum (Fs) subtriangular, fused with basisternum, furcasternal arms (Fsa) and furcasternal pit (Fsp); postfurcasternum (Pfs) divided into two lateral, subtriangular sclerites, which not fused with others; katepisternum (Kes) separated from basisternum, and trochantin (Tn). Cercus slender and hairy, each segment enlarged distally, cercal chaetotaxy similar in male and female: apical whorl comprises a set of acute bristles, lengths of acute bristles slightly exceeding length of a cercal segment; intercalary setae shorter than acute bristles (Figs. 1, 4, 9). Pilosity generally long and colorless (Fig. 1).

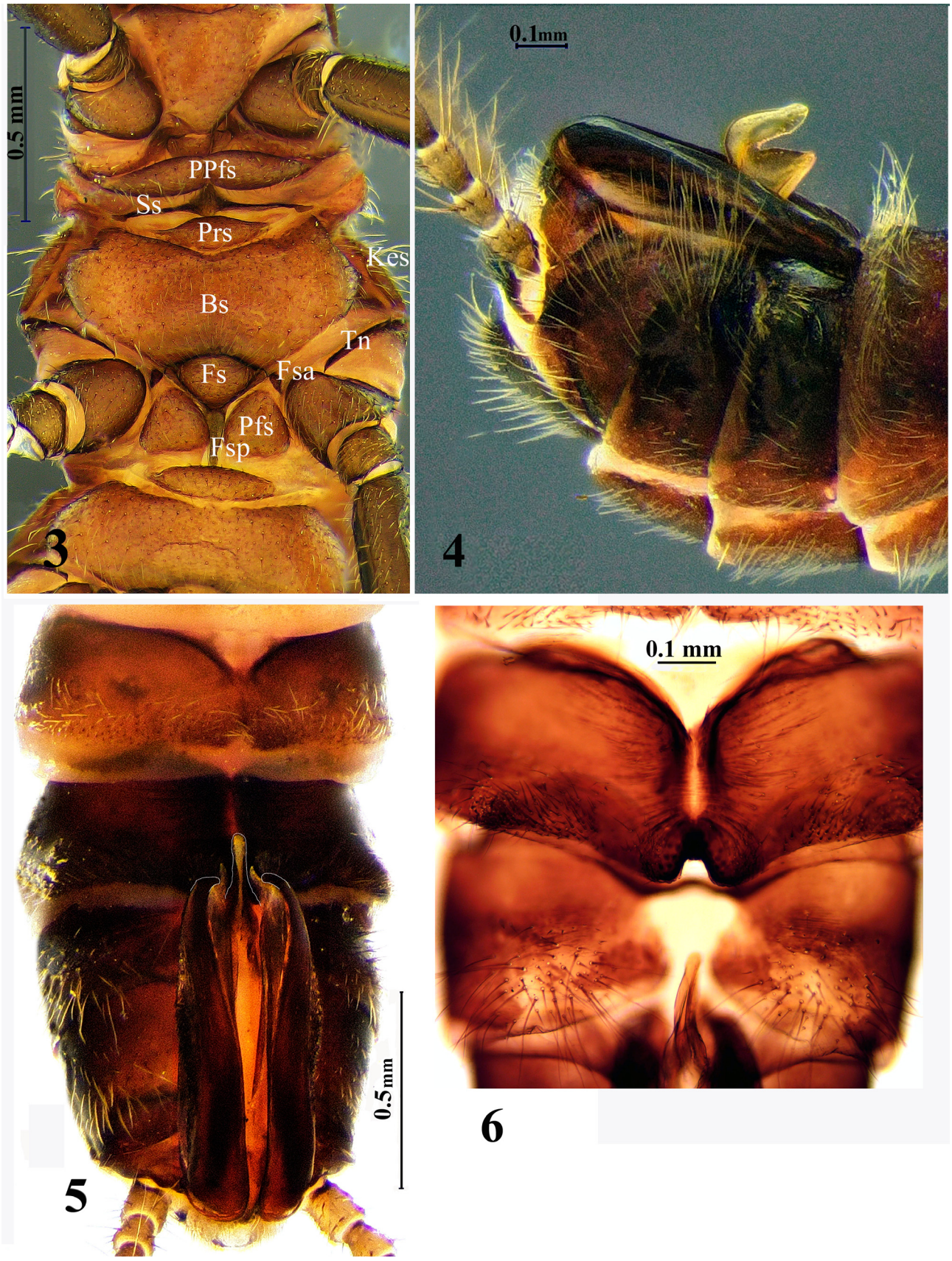
Male. Body length of males 3.4–5.0 mm. Wings short (Fig. 1), length not exceeding 2.1 mm. Tergum VII enlarged, heavy sclerotized, anterior margin with a notch in the middle, edges rounded; the posterior margin extending backward and upward, forming a darkly sclerotized posteromedial process with a pair of small and short rounded lobes, covered with sensilla basiconica; the posterolateral edges swollen and drawn back (Figs 5, 6). Tergum VIII with triangular antero-middle membranous field, dividing tergum into two swollen lobes, covered with long, setae posteriorly (Fig. 6). Terga IX–X deeply cleft, with medial membranous areas. Epiproct with two limbs appressed to each at base. The basal portion of epiproct fused with main epiproctal sclerite and covered with setae (Figs. 4, 7, 8). Paired triangular heavy sclerotized laterobasal sclerite divided from the main epiproctal sclerite (Figs. 4, 5). Main epiproct sclerite or upper limb, large, bivalve, oval, prolonged, and divided entire length into two parts, each part wider basocaudally, than apically, reaching posterior or posterolateral margins of tergum VI, split in dorsal view (Figs. 1, 4); each lateral edge slightly trust inward and bearing short setae, forming transversal setal rows (Figs. 5, 8); apex rounded and curved inward (Figs. 5, 8). Main epiproct sclerite connected with an eversible crest developed in a pair of membranous folds conspicuous dorsoapically; each fold scoop-shaped, contorted similarly as main epiproctal sclerite; each tip of eversible crest papilliform, slightly longer than the main sclerite and covered inside with thin and relatively long sensor setae (Figs. 5, 8). Membranous folds of eversible crest surround a lower portion (or lower limb) of the main epiproctal sclerite appearing as horizontal, long, narrow, moderately sclerotized shallow gutter, ending with vertical triangular process, and inner sclerite. Inner sclerite arranged on inner edge of triangular process and arising from small, shallow depression of the low limb, and appears as a weakly sclerotized hook curved upward then downward with a wide and blunt apex (Fig. 8); hook arches above the abdomen in lateral view (Fig. 4); in dorsal view, inner sclerite with a elongated and rounded apex, extending forward of the membranous apices of an eversible crest and the main epiproctal sclerite (or upper limb) (Figs. 5, 6). Subgenital plate spade-shaped, mesoposterior margin with a small rectangular tip, indented laterally; ventral vesicle absent (Fig. 7). Fusion plate inverted teardrop shaped, hidden under the paraprocts; retractoral plate appears as small sclerotized sclerite with sharp apex appearing through mesoposterior part of the subgenital plate in ventral view (Fig. 7). Paraprocts rhomb-shaped, prolonged, each anterior corner dilated and rounded (Fig. 7). Cerci 12 segmented.

Female. Body length 4.6–5.6 mm. Wings short, length 2.5–4.5 mm. Abdominal terga I–VIII with broad lon-

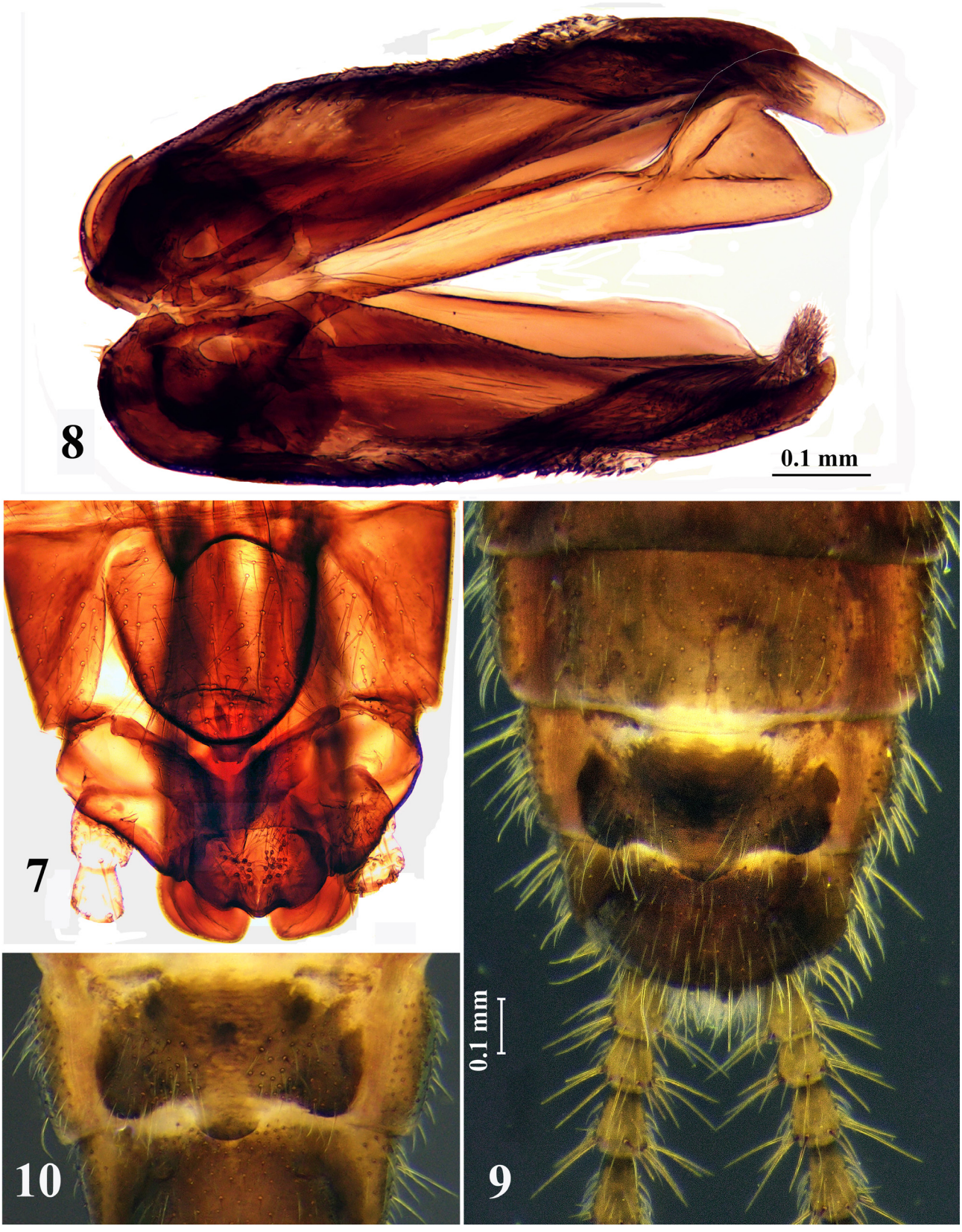
gitudinal membranous areas along the midline; terga IX and X fully sclerotized. Subgenital plate triangular with rounded posterior margin, slightly overhanging sternum IX. A pair of lateral sclerites subtriangularly shaped, covered with long colorless hairs, posterior edges rounded, not exceed the length of sternum VIII. A pair of small, oval and prolonged anterior sclerites located above subgenital plate (Fig. 9). Subgenital plate unevenly pigmented, lateral sclerites darker than posteromedial portion of plate (Figs. 9–10). Cerci 16 segmented.



FIGURES 1–2. Male of *Capnia khingana* **sp. n.** 1. Habitus, lateral. 2. Right wings.



FIGURES 3–6. *Capnia khingana* **sp. n.** 3. Mesothoracic sclerite, female, ventral: Bs—basisternum; Fs—furcasternum; Fsa—furcasternal arm; Fsp—furcasternal pit; Kes—katepisternum; Pfs—postfurcasternum; Prs—presternum; PPfs—prothoracic postfurcasternum; Ss—spinassternum; Tn—trochantin. 4. Male, abdominal tip, lateral. 5. Male, abdominal tip, dorsal. 6. Male, terga VI–VII, dorsal.



FIGURES 7–10. *Capnia khingana* **sp. n.** 7. Male, sterna IX–X, ventral. 8. Epiproct, dorsolateral. 9, 10. Female subgenital plate, variation of color pattern, ventral.

Diagnosis. Brachypterous in both sexes, wings covered with tiny dark setae and wing margins with long colorless bristles. Forewing brownish, veins dark brown with small black setae along the entire length. Epiproct consists of two limbs. Main epiproctal sclerite (or upper limb) large, oval, prolonged, and divided the entire length, each

lateral edge thrust inward and bearing short setae; apex curved inward. An eversible crest resembles a pair of membranous scoop-shaped folds contorted in a similar pattern as the main epiproctal sclerite, papilliform at the tip, and longer than the main sclerite. Lower limb long, narrow, with a shallow gutter, ending with vertical triangular process and a unique weakly sclerotized inner sclerite which arranged on the inner edge of triangular process, and resembles a hook with wide and blunt apex; the hook arches above the abdomen. Subgenital plate spade-shaped, mesoposterior margin with a small rectangular tip, indented laterally, ventral vesicle absent. Subgenital plate of female triangular, rounded posteriorly.

Affinities. In general, morphological characters of *C. khingana* fit the concept of *Capnia sensu stricto* (Murányi *et al.* 2014). However, the katepisternum on mesothoracic sclerite is separated from the basisternum. This feature, as well as the form of the lower limb of the epiproct, indicates a similarity with the Nearctic genus *Allocapnia* Claassen, 1928 (Murányi *et al.* 2014). Agreeing with the structure of the epiproct, and the presence of the posteromedial process on male tergum VII, *C. khingana* may be tentatively assigned to the *C. atra* species group (Zhiltzova 2001). However, the weakly sclerotized inner sclerite located at the inner side of vertical triangular process of the lower limb of the epiproct and other features mentioned in diagnosis, readily distinguish *C. khingana* males from all congeners and are unique among all known Capniidae. No closely related species are indicated based on external morphology.

FIGURE 11. Schematic map of the collecting places of *Capnia khingana* **sp. n.** in Lesser Khingan Range, South of the Russian Far East (black dot).

Distribution. The **Lesser Khingan** (**Xiao Hinggan Range, Chinese)** mountain Range occupies the Far East of Russia and northeastern part of Heilongjiang Province of China. The Range has a northwest-southeast axis and is located to the southwest of the Amur River (Heilong Jiang). The Russian part of Lesser Khingan is in the Amurskaya Obast' and the Jewish Autonomous Region and is separated from the Chinese portion by the Amur River Gorge (Fig. 11). The Lesser Khingan was until Quaternary times a part of the great intermontane trough formed by the Northeast (Manchurian) and Zeya-Bureya River plains. The topographic relief consists generally of rounded ridges that are not steep. The length of the Lesser Khingan is about 500 km with a elevational range of 500–1000 m, with

most of the range below 600 m. The mountains are forested, mostly consisting of larch and birch in the north and of mixed broad-leaved and coniferous forests (cedar, spruce, yew, birch, elm, and larch) in the south. Within the limits of the Lesser Khingan, the Khinganskiy State Nature Reserve in Russia and the Reserve Fenglin in China have been established. Adults of *C. khingana* were collected from the upper reaches of the Olochi River and Perval'nyi Stream (Figs. 12, 13) and the Eracta River, which are the tributaries of the Mutnaya River, flowing down from the spurs of the Lesser Khingan Mountains into the Amur River. Adults were found crawling on the ice and snow within 100 m near unfrozen sections of rivers mentioned above.

Etymology. This species is named after the Khingan Range.

FIGURES 12–13. 12. Type locality of *Capnia khingana* **sp. n.** in the upstream of Olochi River, Mutnaya R. Basin, Amur R. Basin. 13. Collecting place of *Capnia khingana* **sp. n.** in the upstream of Pereval'nyi stream, Olochi R. Basin, Mutnaya R. Basin, Amur R. Basin. Photos by I. Balan in May 2019.

Acknowledgements

Author very much appreciated and grateful to I. Balan and D. Kochetkov from the Khinganskyi State Nature Reserve (Arkhara, Amurskaya oblast, Russia) for collected material and slides of the type locality, to V. Loktionov (FSC EATB FEB RAS, Vladivostok, Russia) for kindly help in preparation of pictures. Author sincere thanks to B. Kondratieff (Colorado State University, C. P. Gillette Museum of Arthropod Diversity, Fort Collins, Colorado, USA) for linguistic revision of the manuscript and to D. Murányi (Plant Protection Institute, Hungarian Academy of Sciences, Budapest, Hungary) constructive suggestions improved the manuscript.

References

Banks, N. (1918) Part B: Neuropteroid Insects. *Report of the Canadian Arctic Expedition 1913–1918*, 3, 3–5. https://doi.org/10.5962/bhl.title.64765

Claassen, P.W. (1928) Additions and corrections to the monograph on the Plecoptera of North America. *Annals of the Entomological Society of America*, 21 (4), 667–668.

https://doi.org/10.1093/aesa/21.4.667
DeWalt, R.E., Maehr, M.D., Neu-Becker, U. & Stueber, G. (2019) *Plecoptera Species File Online. Version 5.0/5.0*. Available from: http://Plecoptera.SpeciesFile.org (accessed 9 September 2019)
Kawai, T. (1969) New stoneflies (Plecoptera) of the family Capniidae from Kamchatka. *Entomologicheskoye Obozrenie*, 48 (4), 863–867.
Koponen, J.S.W. & Brinck, P. (1949) Neue oder wenig bekannte Plecoptera. *Annales Entomologici Fennici*, 15 (1), 1–21.
Murányi, D., Gamboa, M. & Orci, K.M. (2014) *Zwicknia gen. n.,* a new genus for the *Capnia bifrons* species group, with descriptions of three new species based on morphology, drumming signals and molecular genetics, and a synopsis of the west Palaearctic and Nearctic genera of Capniidae (Plecoptera). *Zootaxa*, 3812 (1), 1–82.
https://doi.org/10.11646/zootaxa.3812.1.1
Nelson, C.R. & Baumann, R.W. (1989) Systematics and distribution of the winter stonefly genus *Capnia* (Plecoptera: Capniidae) in North America. *The Great Basin Naturalist*, 49 (3), 289–363.
https://doi.org/10.5962/bhl.part.22645
Pictet, F.J. (1833) Mémoire sur les Métamorphoses des Perles. *Annales des Sciences Naturales*, 28, 44–65.
https://doi.org/10.5962/bhl.part.8008
Pictet, F.J. (1841) *Histoire naturelle des insectes Névroptères. Famille des Perlides*. Kessmann-Baillière, Genève-Paris, 423 pp.
Potikha, E.V. & Zhiltzova, L.A. (1996) On the fauna and ecology of stoneflies (Plecoptera) of the Sikhote-Alin Biosphere Natural Reserve. *Entomological Obozrenie*, 76 (5), 613–618.
Zapekina-Dulkeit, J.I. (1970) Two new species of Plecoptera from Siberia. *Revue d'Entomologie de l'USSR*, 49 (1), 156–160.
Zapekina-Dulkeit, J.I. (1975a) To the stonefly fauna (Plecoptera, Insecta) of the Lake Baikal Basin Rivers. *Trudy Gosudarstvennogo zapovednika "Stolbij"*, 10, 199–217.
Zapekina-Dulkeit, J.I. (1975b) New species of Plecoptera from Southern Siberia. *Revue d'Entomologie de l'USSR*, 54 (2), 378–382.
Zetterstedt, J.W. (1840) Famil. 5. Perlariae Latr. *In*: Zetterstedt, J.W. (Ed.), *Insecta Lapponica descripta, Lipsiae*, 1840, pp. 1055–1060.
https://doi.org/10.5962/bhl.title.8242
Zhiltzova, L.A. (1979) A new species of stoneflies from family Capniidae (Plecoptera) from the Far East. New species of the insects. *Trudy Vsesoyuznogo Entomologicheskogo Obzhestva*, 61, 15–17. [in Russian]
Zhiltzova, L.A. (1980) New species of Capniidae (Plecoptera) from the Kuril Islands. *In*: Levanidov, V., Levanidova, I., Tchereshnev, I. & Makarchenko, E. (Eds.), *Freshwater Fauna of the Far East.* AN SSSR, Vladivostok, pp. 54–59. [in Russian]
Zhiltzova, L.A. (1981) New species of stoneflies (Plecoptera) from the Far East. Morphology and systemstics of the insects. Academy of Sciences of the USSR. *Trudy Zoologicheskogo Instituta*, 92, 3–7. [in Russian]
Zhiltzova, L.A. (2001) Plecoptera fauna of Capniidae of Russia and adjacent territories (within the limits of the former USSR). *In*: Dominguez, E. (Ed.), *Trends in Research in Ephemeroptera and Plecoptera.* Kluwer Academic/Plenum Publishers, New York, 423–429.
https://doi.org/10.1007/978-1-4615-1257-8_49
Zhiltzova, L.A. (2003) Stoneflies (Plecoptera). Gruppe Euholognata. *Fauna of Russia and Neighbouring Countries*, New Series, 145, 1 (1), 1–538. [in Russian]
Zhiltzova, L.A. & Levanidova, I.M. (1978) New species of the stoneflies (Plecoptera) from the Far East. New species of animals. Academy of Sciences of the USSR. *Trudy Zoologicheskogo Instituta*, 61, 3–29. [in Russian]