

The first record of the winter stonefly genus *Mesyatsia* Ricker & Ross, 1975 (Plecoptera: Taeniopterygidae) from Korea

Jeong Mi Hwang¹, Jun Mi Hur², Ji Hyoun Kang¹, Yeon Jae Bae^{1,3} and Dávid Murányi^{4,*}

¹Korean Entomological Institute, Korea University, Seoul 02841, Republic of Korea

²Animal Resources Division, National Institute of Biological Resources, Incheon 22689, Republic of Korea

³Department of Environmental Science and Ecological Engineering, Graduate School, Korea University, Seoul 02841, Republic of Korea

⁴Department of Zoology, Eszterházy Károly Catholic University, Leányka u. 6, Eger H-3300, Hungary

*Correspondent: d.muranyi@gmail.com

The genus *Mesyatsia* Ricker & Ross, 1975 is a small genus of the family Taeniopterygidae with only six species worldwide. This genus is mainly distributed in Asia, but has never been reported in Korea. In this paper, we report *Mesyatsia makartchenkoi* Teslenko & Zhiltzova, 1992 for the first time from the Korean Peninsula. The specimens were collected from Odaesan National Park, Bangtaesan Natural Recreation Forest, and Gariwangsan Natural Recreation Forest in Gangwon-do, South Korea by mainly Malaise traps and a few by sweep net. Some pharate larvae and adults crawling on the snow were also collected by handpicking. This species is characterized by the following features: pterostigma with dark spots; abdominal sternum 9 with vesicle; abdominal tergum 10 medially divided into two; subgenital plate strongly elongated, scoop-shaped, upcurved with tongue-shaped apex; cercus blunt. We provide materials, diagnosis for newly recorded species, and distributions. Additionally, we include a provisional key to the genera of Taeniopterygidae from Korea based on males.

Keywords: Korea, *Mesyatsia makartchenkoi*, new record, Plecoptera, Taeniopterygidae

© 2021 National Institute of Biological Resources

DOI:10.12651/JSR.2021.10.4.419

INTRODUCTION

Taeniopterygidae Klapálek, 1905 is a relatively small stonefly family with only 116 extant species known throughout the Holarctic Region (DeWalt *et al.*, 2021). This family is rarely collected and little known in Korea. Currently, only two taeniopterygid species have been recorded from Korea: *Strophopteryx nohirae* (Okamoto, 1922) and *Taenionema japonicum* (Okamoto, 1922) (Hwang and Murányi, 2020).

The genus *Mesyatsia* Ricker & Ross, 1975 is a small genus of Taeniopterygidae with only six species, known from the Palearctic and Oriental regions (Teslenko and Zhiltzova, 1992; DeWalt *et al.*, 2021). Among them, two species (*Mesyatsia imanishii* (Uéno, 1929) and *M. o-notata* (Okamoto, 1922)) were recorded from Japan and one species (*M. makartchenkoi* Teslenko and Zhiltzova, 1992) was recorded from the Russian Far East.

In this study, *M. makartchenkoi* Teslenko and Zhiltzova, 1992, is reported from Gangwon-do, Korea, repre-

senting the first record of the genus *Mesyatsia* from the country. We provide a provisional key to genera of Taeniopterygidae from Korea based on males, with reference to the key of Ricker and Ross (1975).

MATERIALS AND METHODS

The specimens examined were collected by Malaise traps, sweep net and handpicking. All specimens were stored in 75% ethanol. Vouchers have been deposited in the Korea University Entomological Museum, Seoul, Republic of Korea (KUEM), the National Institute of Biological Resources Incheon, Republic of Korea (NIBR), and the Eszterházy Károly Catholic University Collection, Eger, Hungary (EKCUC). External morphology was examined under a Zeiss Stemi-2000 dissecting microscope and the microscopic images of the specimens were taken using a stereomicroscope (ZEISS V12, Germany). Color images were taken using Nikon Z 6 digital camera.

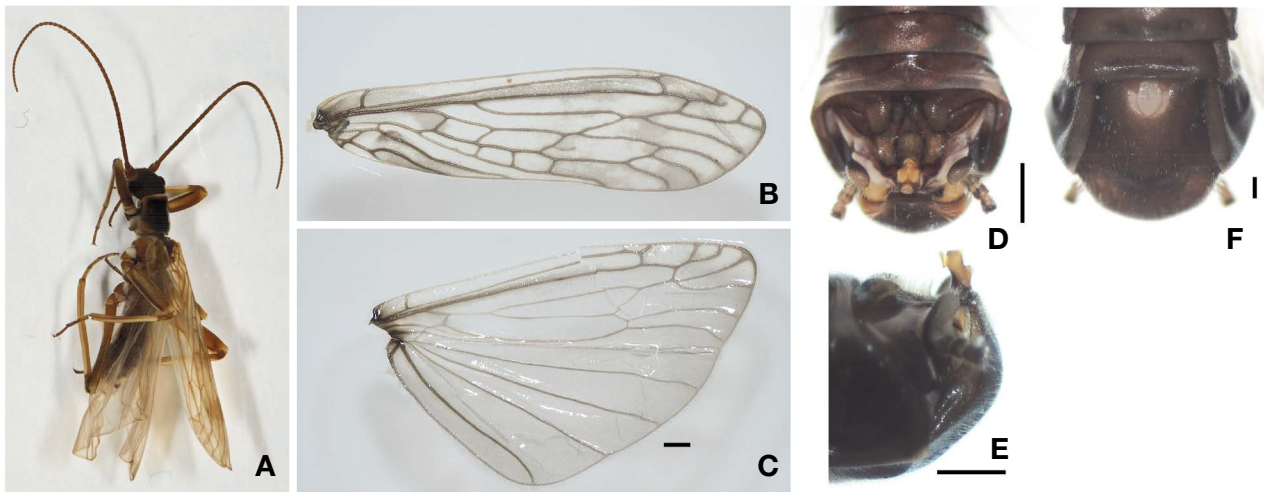


Fig. 1. *Mesyatsia makartchenkoii* Teslenko & Zhiltzova, 1992, male. A. habitus, dorsal view; B. forewing, dorsal view; C. hindwing, dorsal view; D. terminalia, dorsal view; E. terminalia, lateral view; F. terminalia, ventral view. Scale bar = 0.45 mm.

The abbreviations used in the taxonomic account are as follows: larva (L), male (M), female (F), Malaise trap (MT), and Gangwon-do (GW).

SYSTEMATIC ACCOUNTS

Order Plecoptera Burmeister, 1839
 Family Taeniopterygidae Klapálek, 1905
 Subfamily Brachypterainae Zwick, 1973
 Genus *Mesyatsia* Ricker & Ross, 1975

Mesyatsia makartchenkoii Teslenko and Zhiltzova, 1992 (Figs. 1–3)

Mesyatsia makartchenkoii Teslenko and Zhiltzova, 1992: 57.

Material examined. Korea: 1M, GW: Odaesan National Park, Odaesan-ro, Jinbu-myeon, Pyeongchang-gun, alt. 929 m, 37°47'34.58"N, 128°33'37.9"E, 2019-IV-23, Ham DS (by Sweeping) [KUEM]; 1F, GW: Odaesan National Park, Odaesan-ro, Jinbu-myeon, Pyeongchang-gun, alt. 830 m, 37°47'5.67"N, 128°34'16.97"E, 2019-IV-23, Ham DS (by hand) [KUEM]; 4M, same locality, 2021-II-19-IV-15, Hwang JM & Ham DS (by MT) [KUEM]; 2M & 1F [EJU], 1L, 6M [KUEM], GW: Odaesan National Park, above Sangwonsa Temple, Odaesan-ro, Jinbu-myeon, Pyeongchang-gun, 37°47'35.8"N, 128°33'43.2"E, 2020-III-03, Hwang JM (by hand); 1M, GW: Odaesan National Park, Odaesan-ro, Jinbu-myeon, Pyeongchang-gun, alt. 941 m, 37°47'35.47"N, 128°33'43.19"E, 2020-III-03-IV-03, Hwang JM & Ham DS (by MT) [NIBRIN 0000935762]; 2M, 1F, same locality, 2021-II-19-IV-15, Hwang JM & Ham DS (by MT) [KUEM]; 1F, GW: Odae-

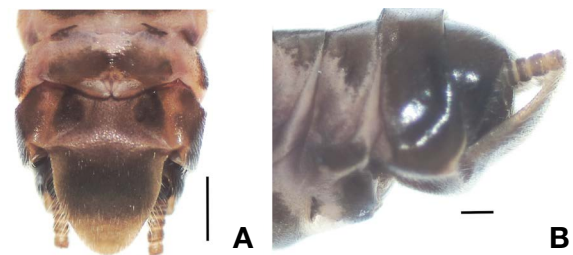


Fig. 2. *Mesyatsia makartchenkoii* Teslenko & Zhiltzova, 1992, female. A. terminalia, ventral view; B. terminalia, lateral view. Scale bar = 0.45 mm.

san National Park, Odaesan-ro, Jinbu-myeon, Pyeongchang-gun, alt. 822 m, 37°47'4.20"N, 128°33'42.31"E, 2021-II-19-IV-15, Hwang JM & Ham DS (by MT) [KUEM]; 1M, GW: Bangtaesan Natural Recreation Forest, Bangdong-ri, Girin-myeon, Inje-gun, alt. 680 m, 37°54'29.57"N, 128°24'25.14"E, 2019-IV-7-V-11, Ham DS (by MT) [KUEM]; 10M, 4F, GW: Gariwangsan Natural Recreation Forest in Hoedong-ri, Jeongseon-eup, Jeongseon-gun, alt. 564 m, 37°25'12.91"N, 128°32'17.00"E, 2020-XI-04-2021-III-12, Park SW & Ham DS (by MT) [KUEM]; 1L, 4M, 5F, GW: Gariwangsan Natural Recreation Forest in Hoedong-ri, Jeongseon-eup, Jeongseon-gun, alt. 697 m, 37°25'4.80"N, 128°31'27.51"E, 2020-XI-04-2021-III-12, Park SW & Ham DS (by MT) [KUEM].

Description. Male adult. General color yellowish brown to dark brown (Figs. 1A, 3B). Pronotum rectangular, dark brown (Figs. 1A, 3B). Wings hyaline with cloudy dark pattern, veins dark brown (Fig. 1B, C). Pterostigma with dark spots (Fig. 1B). Abdominal tergum 1 yellowish brown, membranous. Abdominal terga 2–9 dark brown



Fig. 3. Habitat of *Mesyatsia makartchenkoi* Teslenko & Zhiltzova, 1992: South Korea, Odaesan Mts. A. larva, walking on the snow; B. adult, walking on the ice (photograph by Sunghwan Park).

and strongly sclerotized. Abdominal tergum 9 extended backwards laterally (Fig. 1D). Abdominal sternum 9 with small vesicle (Fig. 1F). Subgenital plate dark, large, strongly elongated, scoop-shaped, upcurved with tongue-shaped apex (Fig. 1E). Abdominal tergum 10 medially divided into two, hairy lobes posteriorly (Fig. 1D). Between these lobes are sclerotized finger-shaped processes of the basal plate of the epiproct positioned (Fig. 1D). Cercus five-segmented, blunt (Fig. 1D). Female adult. Abdominal sternum 8 with wide and dark pregenital plate and triangular vulvar sclerites (Fig. 2A). Postgenital plate of sternum 9 large, elongated, apex rounded subtriangular (Fig. 2B). Cerci with 6 segments.

Distribution. Korea (new record), Russia (Far East).

Remarks. This species was hitherto known only from Russia (Teslenko and Zhiltzova, 1992; DeWalt *et al.*, 2021). Most of the Korean specimens were collected by Malaise trap, but pharate larvae and adults crawling on the snow were also collected by handpicking (Fig. 3).

Key to the genera of Taeniopterygidae from Korea based on males

1. Abdominal sternum 9 with vesicle (Fig. 1F).....
..... *Mesyatsia* Ricker and Ross, 1975
– Abdominal sternum 9 without vesicle 2
2. Apex of male sternum 9 process usually rather sharply
upturned in lateral aspect; lobes absent on the tergum
10..... *Strophopteryx* Frison, 1929
– Apex of male sternum 9 not upturned in lateral aspect;
lobes usually present on the tergum 10.....
..... *Taenionema* Banks, 1905

ACKNOWLEDGEMENTS

We are grateful to Mr. Sunghwan Park and Mr. Jisoo Kim (Korea University) for providing us with their photo-

graphs on the habitat and habitus and Miss Dasel Ham (National Institute of Biological Resources) for providing specimens for this study. We also thank the Korea National Park Service (KNPS) for permitting to collect insects at Odaesan National Park, and the National Gariwangsan Natural Recreation Forest. This work was supported by a grant from the National Institute of Biological Resources (NIBR), funded by the Ministry of Environment (MOE) of the Republic of Korea (NIBR202102106).

REFERENCES

- DeWalt, R.E., M.D. Maehr, U. Hopkins, U. Neu-Becker and G. Stueber. 2021. Plecoptera Species File Online. Version 5.0/5.0. <http://plecoptera.speciesfile.org>
- Hwang, J.M. and D. Murányi. 2020. Checklist of the Korean Stoneflies (Plecoptera) with Six Newly Recorded Species. *Animal Systematics, Evolution and Diversity* 36(1):46-54.
- Klapálek, F.R. 1905. *Conspectus Plecopterorum Bohemiae*. *Acta Societatis Entomologicae Bohemiae (Časopis)* 2:27-32.
- Okamoto, H. 1922. Zweiter beitrage zur Kenntnis der Japanischen Plecopteren. *Bulletin of the Agricultural Experiment Station, Government General of Chosen* 1(1): 1-46.
- Ricker, W.E. and H.H. Ross. 1975. Synopsis of Brachypterinae (Insecta: Plecoptera). *Canadian Journal of Zoology* 53:132-153.
- Teslenko, V.A. and L.A. Zhiltzova. 1992. A new species of the genus *Mesyatsia* Ricker and Ross from Southern Primorye (The Soviet Far East). *Aquatic Insects* 14(1):57-63.
- Uéno, M. 1929. Studies on the stoneflies of Japan. *Memoirs of the College of Science, Kyoto Imperial University Series B* 4(2):97-155.

Submitted: October 6, 2021

Revised: October 19, 2021

Accepted: October 19, 2021