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A NEW AMAZING SPECIES OF THE GENUS *PSEUDISOTOMA* HANDSCHIN, 1924 (COLLEMBOLA: ISOTOMIDAE) FROM THE BERINGIAN REGION

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Summary. Based on materials from northeastern Chukotka and the Aleutian Islands *Pseudisotoma beringiana* **sp. n**. is described. It is rather similar to *P. sensibilis* (Tullberg, 1877), the type species of the genus, but it differs by the complete absence of clavate tibiotarsal setae, the presence of which is considered one of the main diagnostic features of the genus.

Key words: taxonomy, springtails, description, northern Pacific region.

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Резюме. По материалам с северо-востока Чукотки и Алеутских островов описан новый вид, *Pseudisotoma beringiana* **sp. n.** Он весьма близок к типовому виду рода, *P. sensibilis* (Tullberg, 1877), но отличается полным отсутствием головчатых хет на тибиотарзусах, наличие которых считается одним из основных диагностических признаков рода.

INTRODUCTION

The small genus *Pseudisotoma* Handschin, 1924 is known to currently include 8 valid species (Bellinger *et al*., 1996–2025), of which only four were included by M. Potapov (2001) in his key to the world fauna, since the remaining four “species” are either too poorly described or cannot be reliably distinguished from two common and widespread Holarctic species, *P. sensibilis* (Tullberg, 1877) and *P. monochaeta* (Kos, 1942). Unfortunately, both these common species obviously consist of a number of undescribed forms (Potapov, 2001), and the genus as a whole clearly warrants a serious revision. At the same time, the diagnostic features separating it from related genera of Isotominae are of very formal nature. Thus, the species of the genus differ from representatives of *Desoria* Nicolet, 1841 only by the presence of clavate setae on the tibiotarsi, although in both genera there are forms both with and without such setae. For example, fully formed clavate tibiotarsal setae are characteristic of

the ‘winter’ form of *D. nivea* (Schaffer, 1896), while *P. microchaeta* Cassagnau, 1959, briefly described from the Pyrenees, does not have them, although it is considered a species of the genus *Pseudisotoma*. The main difference between *Pseudisotoma* and the genus *Vertagopus* Börner, 1906, *i.e*. the fused two last abdominal segments, is also rather formal. On the one hand, all known species of the latter genus do have separated *Abd*. V–VI, and all representatives of the former have these segments fused. However, this same feature (fused segments) does not prevent the inclusion of a number of species in the genus *Desoria* along with forms, in which these segments are separated.

Unfortunately, there are also problems of distinguishing the leading genera of the subfamily Isotominae using a molecular evidence. Such genera as *Desoria*, *Vertagopus*, *Pseudisotoma*, *Isotoma* Bourlet, 1839, *Isotomurus* Börner, 1903, etc. usually form a complete ‘mess’ in almost all published molecular ‘trees’ (see, for instance, Stevens *et al*., 2006; Stevens & D'Haese, 2016; Valle *et al*., 2021, 2025, etc.). And this ‘mess’ usually shows but little correlation with the existing understanding of morphological genera and species-groups within certain genera. However, abandoning the taxon *Pseudisotoma* at present seems premature. Most of the fully described species have a number of characters in common, even if none of them are unique.

Below we describe a new species of the genus from the Beringian region that is completely devoid of clavate setae on the tibiotarsi, but it appears to be close to *P. sensibilis*, the type species of the genus. This will obviously make the generic diagnosis even more confusing, but it nevertheless reflects the existing reality.

MATERIAL AND METHODS

Type specimens of the new species are stored in the Department of Zoology and Ecology of Moscow State Pedagogical University (MSPU).

Abbreviations used in the text and figures. *Abd.* I–VI – abdominal segments; *Ant*. I–IV – antennal segments; *A*1, *A*2 & *A*7 – setae of distal whorl on tibiotarsi; *G* and *H* – ocelli; leg. – collector; *ms* – microsensillum(a); *p*-row – posterior row of setae on terga; *PAO* – post-antennal organ; *VT* – ventral tube.

DESCRIPTION OF NEW SPECIES

***Pseudisotoma beringiana* Babenko et Fjellberg, sp. n.**

https://zoobank.org/NomenclaturalActs/6DC009D9-F276-458F-8C8A-658EC2C821EB

Figs 1–19

MATERIAL. Holotype: female, **Russia**: northeastern Chukotka, Lavrentiya village, 65.5930°N, 171.0231°W, zoogenic meadow on top of coastal slope, 10.VII 2013, leg. A. Babenko (MSPU). Paratypes: 11 specimens (sex not checked), Benneta Island in Lavrentiya Bay, 65.7505°N, 171.2958°W, wet cliff under bird colony, 26.VII 2013, leg. A. Babenko; 15 juveniles and 3 adults, same island and date, but seagull nests; 33 specimens (sex unchecked), same island, but lake shore, 65.5761°N, 171.0149°W, 25.VII 2013, leg. A. Babenko; 3 specimens, same island, coastal sediments at a mouth of stream, 65.5177°N, 170.9899°W, 19.VII 2013, leg. A. Babenko (MSPU).

ADDITIONAL MATERIAL. **Russia**: Benneta same area around Lavrentiya village, various sites, ~ 150 specimens (in alcohol); **USA**: Alaska, Aleutian Islands, Kasatochi, 52.1687°N, 175.5239°W, grass at cliff base, several specimens, leg. D.S. Sikes.

DIAGNOSIS. A large Isotomidae showing all characters typical of the genus *Pseudisotoma* (small *PAO*, trifurcated maxillary palp, fused *Abd*. V–VI, glandular bases of dorsal setae, long serrated macrochaetae, tridentate mucro, 8–9 distal setae on tibiotarsi, and unguis with one inner tooth) except for the non-clavate tibiotarsal setae.

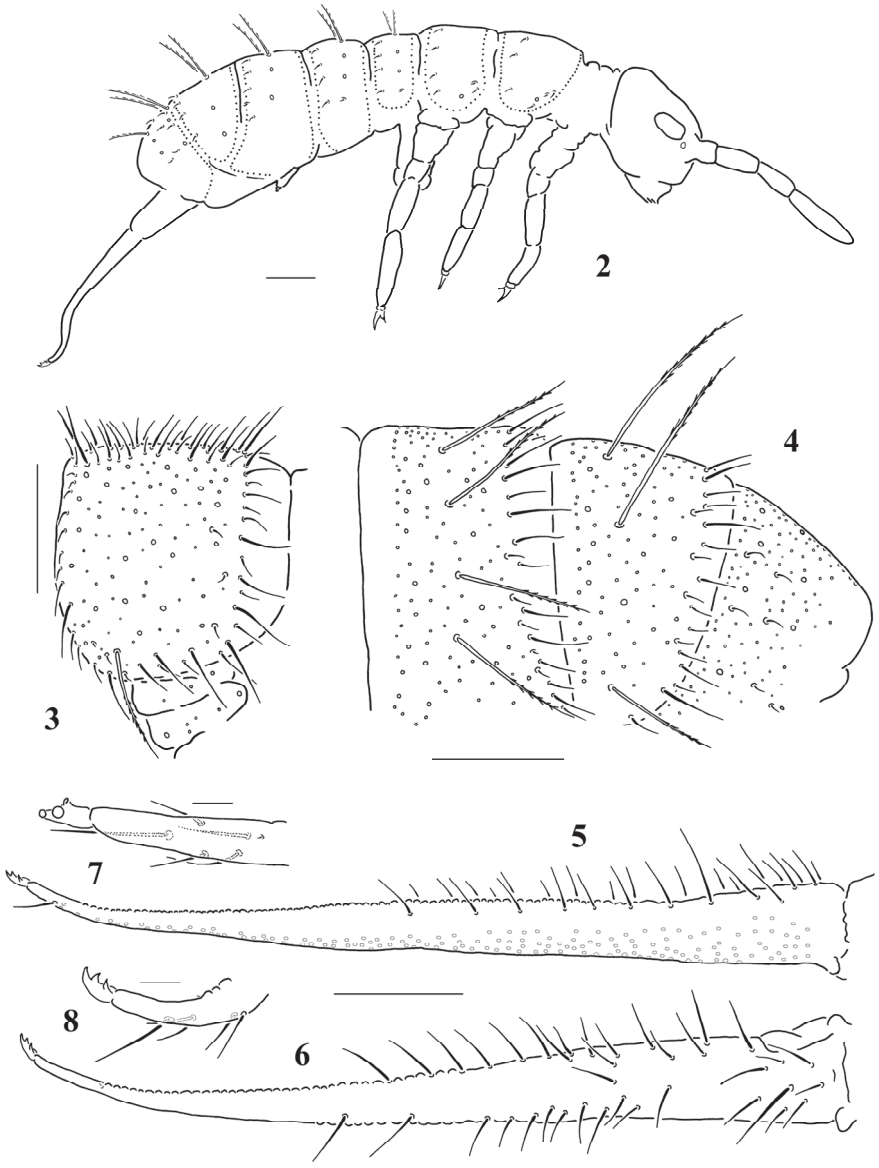
Fig. 1. *Pseudisotoma beringiana* **sp. n.**, general appearance (Pribilof Islands, photo D.S. Sikes).

DESCRIPTION. Body size up to 2.5 mm. Colour uniformly dark with small lighter spots at bases of setae and narrow uncoloured intersegmental belts; posterior and ventral parts of head, appendages and furca lighter (Fig. 1), head dorsally with two white spots between ocelli. Body shape typical of the genus, *Abd*. V–VI fused. Dorsal chaetotaxy dense and strongly differentiated (Figs 3–4), setal bases glandular. Macrosetae long and serrated (Figs 4, 17), those on medial part of *Abd*. V 3.5–4.5 times as long as inner edge of hind unguis. Dorsal macrosensilla shorter than ordinary microsetae, set slightly in front of *p*-row, 55/44446 in number (Figs 2–4) as typical of the genus. The number of microsensilla (11/111 *ms*) also typical.

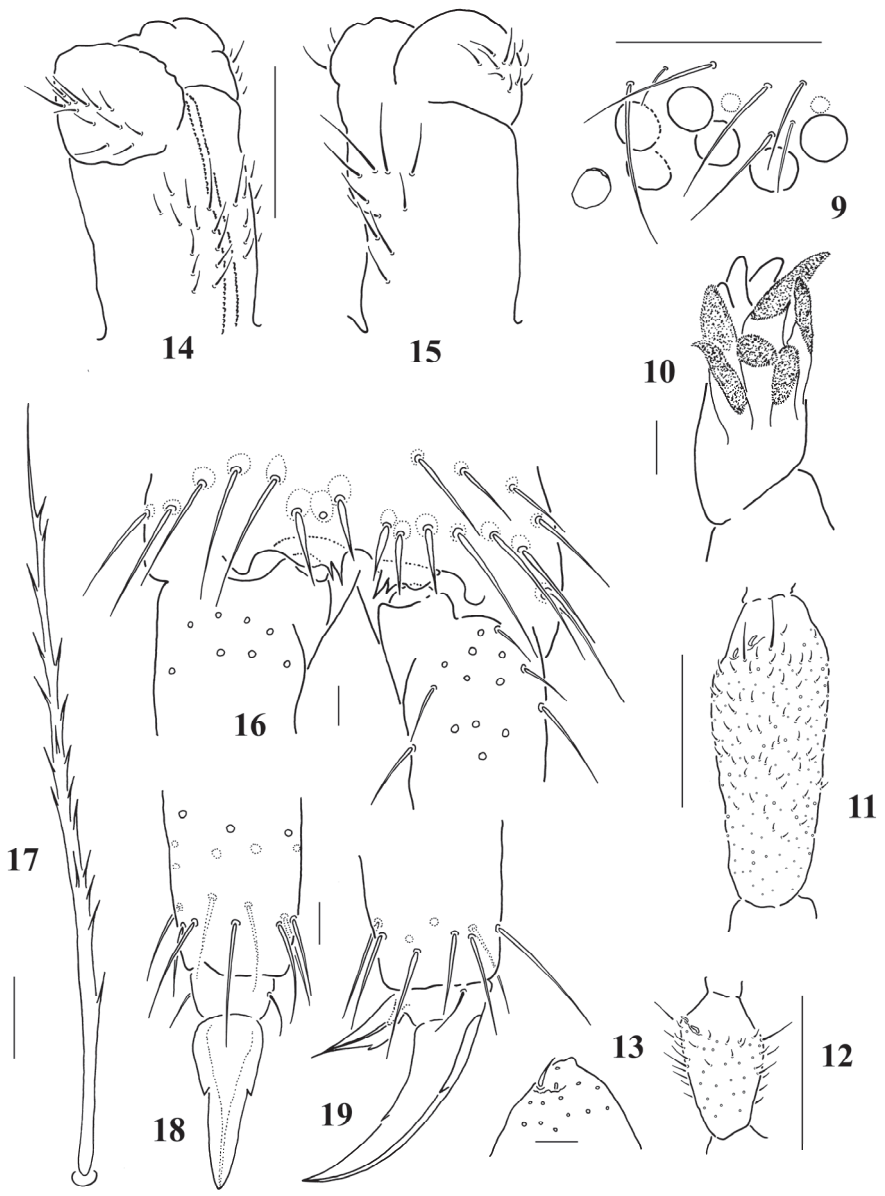
Antennae clearly longer than head. *Ant*. IV with simple subapical pin seta and a small rod-shaped subapical organite (Fig. 13). *Ant*. III organ normal (Figs 11–12), in adults and subadults all antennal segments with numerous short setaceous sensilla (Fig. 11). Each side of head with 8 ocelli, ocelli *G* and *H* distinctly smaller (Fig. 9). *PAO* small, about as long as diameter of nearest ocellus or slightly longer. Labrum with 4/554 setae, apical edge with 4 sharp apical folds and composite apical ciliation. Central part of clypeal field with up to 25–30 setae. Maxillary outer lobe trifurcate with 4 sublobal setae. Labial palp with a complete set of papillae and guards, 4 proximal setae. Basomedial field of labium with 5–6(7) setae, basolateral one with 5 setae. Head ventrally with 5–8 postlabial setae each side of ventral line. Mandibles normal, with moderately strong teeth. Maxillae with 3-toothed capitulum and 6 short lamellae covered with fine denticles.

Ventral side of thorax without setae between legs. Ventral tube with 9–13 frontal setae each side, usually with more than 10+10 lateral setae and up to 10 caudal ones with four setae in transversal apical row (Figs 14–15). Retinaculum with 4+4 teeth and 18–25 setae. Manubrium with up to 60 ventral setae including 3(4)+3 shorter apical setae; manubrial thickening usually with split tips (Fig. 16). Dens with numerous ventral setae, ventroapical

one elongated, almost reaching the apex of mucro (Figs 5, 7–8). Dorsal side of dens with about 30–40 setae in proximal half (Fig. 6). Mucro asymmetric, with three teeth (Figs 7–8). Tibiotarsi 1–3 with 8–9–9 pointed setae in apical whorl, respectively; clavate setae absent,



Figs 2–8. *Pseudisotoma beringiana* **sp. n**., 2 – distribution of dorsal macro- and microsensilla; 3 – chaetotaxy of Th. II; 4 – ibid., Abd. III–VI; 5 – dens, lateral view; 6 – ibid, dorsal view; 7–8 – apical part of dens and mucro. Scales: 2–6 = 0.1 mm, 7–8 = 0.01 mm.



Figs 9–19. *Pseudisotoma beringiana* sp. n.: 9 – PAO and ocelli; 10 – maxillary head; 11 – sensillar equipment of Ant. III, adult; 12 – ibid., juvenile; 13 – antennal tip; 14 – VT, frontal view; 15 – ibid., caudal view; 16 – setae and manubrial thickening in ventroapical part of manubrium; 17 – abdominal macroseta; 18–19, distal part of leg III, different view. Scales: 9, 11–12, 14–15 = 0.1 mm, 10, 13, 16–19 = 0.01 mm.

seta *A*1 (and sometimes also *A*2 and *A*7) seems to be slightly thinner and longer than others (Figs 18–19). Basal part of first leg with three outer setae, as a rule. Unguis with a clear tooth at inner edge and a pair of lateral ones in basal half, also additional tooth on outer side usually visible. Unguiculus with a small corner tooth, about as long as a half of inner edge of unguis.

ETYMOLOGY. The name of the new species reflects its limited distribution on both sides of the Bering Strait.

AFFINITIES. Based on formal criteria and existing generic diagnoses, the new species should be considered as representing the genus *Desoria*. Nevertheless, we believe that the presence of all characteristic features of the genus *Pseudisotoma* (except the presence of non-clavate tibiotarsal setae), such as a small *PAO*, trifurcated maxillary palp, a complete set of microsensilla and a specific number of dorsal macrosensilla, tridentate mucro, 8–9 distal setae on the tibiotarsi, fused *Abd*. V–VI, glandular basis of setae, and long serrated macrosetae, allows us to classify it as belonging to the genus *Pseudisotoma*. Of course, all these characters can be also found in the genus *Desoria*, but not all together, as a rule. In particular, most of them are also characteristic of the Asian *pjasini*-group (see Potapov, 2001), although none of them have a trifurcate maxillary palp and fused last abdominal segments. In addition, all of them have two inner teeth on unguis and most (with the exception of *D. multisetis* (Carpenter & Philips, 1922)) have only 3, not 4, proximal setae on the labium. Of course, this leaves three insufficiently described species of this group (*D. choi* (Lee, 1977), *D. tianshanica* Hao & Huang, 1995 and *D. imparidentata* (Stach, 1964)) in a somewhat suspended state; all of them have, however, two inner teeth on the unguis, the former two are characterized by separated *Abd*. V–VI, while *D. imparidentata* can easily be distinguished from *P. beringiana* sp. n. by its coloration, which in this species is *pale yellowish* with *one discontinuous irregular, longitudinal band, beginning on the head and running up to Abd. V* (Stach, 1964: 14).

Except for the absence of clavate setae, *P. beringiana* sp. n. is very similar to the type species of the genus, *P. sensibilis* auct., which probably represents a complex of closely related forms (Potapov, 2001). The latter also inhabits the area of the type locality of the new species, but they do not co-occur. *Pseudisotoma beringiana* sp. n. can be distinguished by its darker coloration, a larger number of setae on the *VT*, the tenaculum and furca, yet this may well be account for its larger size (and/or age). Of the significant characters, it is perhaps worth mentioning the number of basomedial setae on the labium – 4 in *P. sensibilis*, *vs* 5–6 in *P. beringiana* sp. n., as well as a small but clearly spherical subapical organite on the antennae in *P. sensibilis*, *vs* rod-shaped in *P. beringiana* sp. n. Unfortunately, there is some discrepancy in the literature regarding the number of setae in the basomedial part of the labium in *P. sensibilis*, which may be 4 (according to the diagnosis of the genus in Potapov, 2001) or 5 (Fjellberg, 2007, data for *P. sensibilis*). We checked five specimens from Novaya Zemlya (not far from Matochkin Shar where types have probably been collected) and all of them have only 4 such setae. The same is true for specimens from Magadan (1979, A. Fjellberg leg.) and a recent Caucasian collection. It should be also mentioned that *P. ohtanii* (Yosii, 1972), which *is inseparable from P. sensibilis s.l.* (Potapov, 2001: 428), has *4–5 basomedial setae* (ibid.).

Among the known species of the genus there is one insufficiently described form, *i.e*. *P. microchaeta* Cassagnau, 1959, which, like *P. beringiana* sp. n., lacks clavate setae on the tibiotarsi. Its specific status is not especially clear but it can be easily distinguished from *P. beringiana* sp. n. by the absence of both inner and lateral teeth on the unguis. Besides, the Pyrenees and Beringia are very remote regions, which can be considered as an additional argument in favor of their independence.

DISTRIBUTION AND ECOLOGY. The species has a narrow-Beringian distribution, being found only on shores of the northern Pacific Ocean (Babenko, 2017): in addition to the vicinity of Lavrentiya, it is still known only from one of the islands of the Aleutian chain

and on St. Paul Island (Pribilof islands) (Fig. 20). In the vicinity of Lavrentiya, it inhabits a wide variety of coastal communities from hygromorphic plant associations to zoogenic meadow communities.

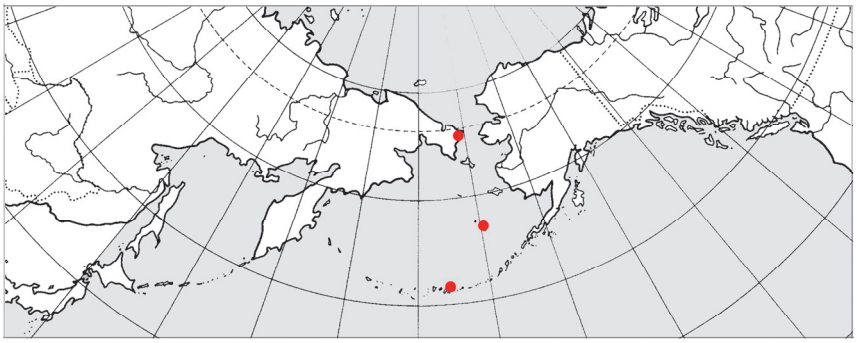


Fig. 20. Known localities of *Pseudisotoma beringiana* **sp. n.**

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REFERENCES

Babenko, A. 2017. Springtails (Collembola) of eastern Chukotka: characteristics of the fauna and species assemblages. *Entomological Review*, 97(7): 870–892. DOI: 10.1134/S0013873817070041

Bellinger, P.F., Christiansen, K.A. & Janssens, F. 1996–2025. *Checklist of the Collembola of the World*. Available at: http://www.collembola.org (accessed 26 August 2025)

Börner, C. 1903. Neue altweltliche Collembolen, nebst Bemerkungen zur Systematik der Isotominen und Entomobryinen. *Sitzungsberichten der Gesellschaft naturforschender Freunde zu Berlin*: 129–182. DOI: 10.5962/bhl.part.29866

Börner, C. 1906. Das System der Collembolen nebst Beschreibung neuer Collembolen des Hamburger Naturhistorischen Museums. *Mitteilungen aus dem Naturhistorischen Museum in Hamburg*, 23: 147–188.

Bourlet, C. 1839. Mémoire sur les Podures. *Mémoires de la Société Royale des Sciences, de l'Agriculture et des Arts à Lille*, 1: 377–418.

Carpenter, G. H., & Phillips, K. J. 1922. The Collembola of Spitsbergen and Bear Island. *Proceedings of the Royal Irish Academy. Section B: Biological, Geological, and Chemical Science*, 36: 11–21. Available at: https://www.jstor.org/stable/20490290

Cassagnau, P. 1959. Faune française des Collemboles (X). Espèces nouvelles ou peu connues des Pyrénées et du Sud-Ouest. *Vie et Milieu*, 10 (1): 68–88. Available at: https://hal.sorbonne-universite.fr/hal-02886949v1

Fjellberg, A. 2007. *The collembola of Fennoscandia and Denmark*. Part II. *Entomobryomorpha and Symphypleona*. *Fauna Entomologica Scandinavica*, 42. Leiden, Brill. 264 pp.

Handschin, E. 1924. Die Collembolenfauna des Schweizerischen Nationalparkes. *Denkschriften der Schweizerischen Naturforschenden Gesellschaft*, 60(2): 89–174.
Hao, Z. & Huang, R. 1995. Seven new species of the Family Isotomidae from Xiajiang, China (Collembola: Arthropleona). *Acta Zootaxonomica Sinica*, 20(1): 68-80. [In Chinese]
Kos, F. 1942. Izotomide Vzhodnih Julijskih Alp. *Rasprave. Matematično-prirodoslovenega razreda, Akademije znanosti in umetnosti v Ljubljani*, 2: 115–160.
Lee, B.-H. 1977. A Study of the Collembola Fauna of Korea. IV. The Family Isotomidae (Insecta), with description of five new species. *Pacific Insects*, 17(2–3): 155–169.
Nicolet, H. 1841. Note sur le *Desoria saltans*, insecte de la famille des Podurelles. *Bibliothèque Universelle de Genève*, Nouvelle Série, 32: 384–387.
Potapov, M.B. 2001. *Synopses on Palaearctic Collembola: Isotomidae*. *Abhandlungen und Berichte des Naturkundemuseums Görlitz*, 73(2): 1–603.
Schäffer, C. 1896. Die Collembolen der Umgebung von Hamburg und benachbarter Gebiete. *Mitteilungen aus dem Naturhistorishen Museum in Hamburg*, 13: 149–216.
Stach, J. 1964. Materials to the knowledge of Chinese collembolan fauna. *Acta zoologica cracoviensia*, 9(1): 1–26.
Stevens, M.I., & D'Haese, C.A. 2017. Morphologically tortured: taxonomic placement of an Antarctic springtail (Collembola: Isotomidae) misguided by morphology and ecology. *Zoologica Scripta*, 46(2): 180–187. DOI: 10.1111/zsc.12204
Stevens, M.I., Fjellberg, A., Greenslade, P., Hogg, I.D. & Sunnucks, P. 2006. Redescription of the Antarctic springtail *Desoria klovstadi* using morphological and molecular evidence. *Polar biology*, 29: 820–830. DOI: 10.1007/s00300-006-0120-y
Tullberg, T. 1877. Collembola borealia. Nordiska Collembola beskrifna af Tycho Tullberg. *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar*, 33(5): 23–42.
Valle B., Cucini, C., Nardi, F., Caccianiga, M., Gobbi, M., Di Musciano, M., Carapelli, A., Ficetola, G.F., Guerrieri, A. & Fanciulli, P.P. 2021. *Desoria calderonis* sp. nov*.,* a new species of alpine cryophilic springtail (Collembola: Isotomidae) from the Apennines (Italy), with phylogenetic and ecological considerations. *European Journal of Taxonomy*, 787: 32–52. DOI: 10.5852/ejt.2021.787.1599
Valle B., Barbon, G., Cucini, C., Nardi, F., Ambrosini, R., Boschi, S., Buda, J., Ficetola G.F., Frati, F., Kováč, Ľ., Marta, S., Scotti, R., Rivalta, V.T., Zimmer, A., Gobbi, M. & Caccianiga, M. 2025. The Unexplored Biodiversity of 'Glacier Fleas' (Hexapoda: Collembola): Taxonomy, Distribution and Ecology in the European Alps and Apennines. *Journal of Zoological Systematics and Evolutionary Research,* 2025, 1616350: 1–34. DOI: 10.1155/jzs/1616350
Yosii, R. 1972. Collembola from the alpine region of Mt. Poroshiri in the Hidaka Mountains in Hokkaido. *Memoirs of the National Science Museum Tokyo*, 5: 77–99.