

Original Research

Significant records of plants, algae, fungi, and animals in SE Europe and adjacent regions, 3

Aljaž Jakob¹, Laura Štampar², Žan Lobnik Cimerman²,
Simona Strgulc Krajšek², Miloš Vittori², Dren Dolničar³

Abstract

In this paper, we present two significant records of bryophytes in Slovenia, *Cryphaea heteromalla* and *Riccia cavernosa*, which were found in new phytogeographical regions. We report the three new records of an isopod *Armadillo officinalis*, a species that has been considered possibly extinct in Slovenia, and a new record of bat, *Plecotus macrobullaris*, from the Julian Alps.

Keywords

Cryphaea heteromalla; *Riccia cavernosa*; bryophytes; mosses, liverworts, flora; *Armadillo officinalis*; Isopoda; isopods; *Plecotus macrobullaris*; Chiroptera; bats; fauna; Slovenia

1 ZRC SAZU, Jovan Hadži Institute of Biology, Novi trg 2, 1000 Ljubljana, Slovenia

2 University of Ljubljana, Biotechnical Faculty, Department of Biology, Večna pot 111, 1000 Ljubljana, Slovenia

3 Tržaška cesta 62, 1111 Ljubljana

4 University of Maribor, Faculty of Natural Sciences and Mathematics, Maribor, Slovenia

* Corresponding author:

All authors contributed equally to this work. For correspondence, see the individual chapters.

Editors:

Simona Strgulc Krajšek² and Tina Klenovšek⁴

Citation: Jakob, A., Štampar, L., Lobnik Cimerman, Ž., Strgulc Krajšek, S., Vittori, M., Dolničar, D., (2024). Significant records of plants, algae, fungi, and animals in SE Europe and adjacent regions 3. Acta Biologica Slovenica 68 (1)

Published: 23.12.2024

<https://doi.org/10.14720/abs.68.01.21460>

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY SA) license

Cryphaea heteromalla (Hedw.) D. Mohr., Crypheaceae (moss, bryophyte)

Author(s)	Aljaž Jakob
Corresponding author	Aljaž Jakob (aljaz.jakob@zrc-sazu.si)
Leg.	Aljaž Jakob
Country	Slovenia
Statement of significance	First record in Slovenia outside the submediterranean region
Locality description	Gorenjska, Medvode, Gorenja vas-Reteče, the gravel pit 1.2 km northeast of the village.
Habitat	In a partially flooded gravel pit, a semi-permanently flooded riparian forest, on <i>Salix alba</i> bark
Date of observation	2024-06-28
Geographical coordinates	N 46.16747309°, E 14.38683831°
Voucher	Photo documented

Cryphaea heteromalla was hitherto known only from submediterranean parts in the southwestern part of Slovenia (Martinčič 2024). The localities are in Vipava Valley (Martinčič, 2016), from the area of Škocjan Caves (Strgulc Krajšek et al., 2023) and from the flysch Šavrin hills southeast of Koper, where the species is not rare in humid microlocalities (pers. obs.). The new record is the first find of this Atlantic-Mediterranean species (Hill et al., 2007) in the central part of Slovenia in the pre-Alpine phytogeographical region.

It has been noted this species is benefiting and spreading after the increase in air quality in Europe towards the end of 20th and beginning of 21st century. However, in Germany, the spread of this species has additionally been linked to climate change and eutrophication of the environment (Müller, 2016). Since the new locality is in a highly anthropogenic environment in intensely managed agricultural land, eutrophication and climate change might likely play a role in the spread of this species to continental parts of Slovenia. The species is expected to be found elsewhere in similar anthropogenic and eutrophic environments.

Cryphaea heteromalla is very distinctive when fertile, it has erect sporophyte-bearing shoots with several capsules growing along just one side (Figure 1). The capsules are 2.5–3 mm long and have a very short seta (Preston, 2010). In Europe, confusion is only possible with larger *Dendrocryphaea lamyana*, which grows in regularly flooded habitats, such as river rocks and bases of riparian trees, and has blunter leaves (Preston, 2010; Casas, 2006). It is a rare plant with strictly Atlantic-Mediterranean distribution, and it is not expected to occur in Slovenia (Hill et al., 2007).

Funding

This research was funded by Slovenian Research and Innovation Agency (ARIS), grant numbers MR-55879 and P1-0236.



Figure 1. *Cryphaea heteromala* with characteristic erect shoots with several laterally growing capsules (photo: A. Jakob).

Riccia cavernosa (Hoffm.) Hoffm., fam. Ricciaceae (liverwort, bryophyte)

Author(s)	Laura Štampar, Žan Lobnik Cimerman, Simona Strgulc Krajšek
Corresponding author	Simona Strgulc Krajšek (simona.strgulc@bf.uni-lj.si)
Leg.	Laura Štampar
Country	Slovenia
Statement of significance	The third known locality in Slovenia, first in the dinaric phytogeographical region
Locality description	Notranjska, Cerkniško Jezero, Laze pri Gornjem Jezeru, left bank of river Jezerščica, next to the bridge near the Malnšče observation point, 550 m a.s.l.
Habitat	damp sandy soil
Date of observation	2024-08-30
Geographical coordinates	N 45.728611°, E 14.404167°
Voucher	Herbarium LJU (s.n.)

Riccia cavernosa (Hoffm.) Hoffm. is a temperate species of a complex thalloid liverwort with a circumpolar distribution. It is also present in the tropics and the Southern Hemisphere (Hill & Preston, 1998). It is typically found in temporarily wet habitats such as the banks of ponds, ditches, rivers, wetlands, and other periodically inundated sites (Frey et al., 2006).

R. cavernosa is a species from subgenus subgenus *Ricciella* (A. Braun) Boulay, section *Spongodes* Nees (Hodgetts et al., 2020). It is characterised by very distinctly perforated, yellow-green thallus without reddish colouration. A short, inconspicuous groove is visible on the upper surface only at the tip of the lobes (Long, 2010). The species has significant morphological similarities to *R. crystallina* L., therefore ripe spores are needed for reliable identification (Paton, 1999).

R. cavernosa is listed as the least concerned (LC) in the European Red List (Hodgetts et al., 2019). It is widespread in Europe but rare in the Mediterranean region (Blockeel et al., 2014), and its conservation status varies significantly across different countries. In Italy and Austria, it is endangered (EN), in Hungary, it is near threatened (NT), and in Croatia, it has no conservation status (Hodgetts and Lockhart, 2020). In Slovenia, it was found for the first time in 2021 in the vicinity of Maribor by Ž. Lobnik Cimerman (Ellis et al., 2022) and later also near Dokleževje in the Prekmurje Region (Lobnik Cimerman et al., 2023). In Slovenia, it has a status of endangered species (Martinčič, 2024).

Our sample was collected from a sandy substrate on the left bank of the Jezerščica River, approximately 80 meters downstream from the bridge near the Malnšče observation point. The Jezerščica River is part of the Stržen River, flowing near Gorenje Jezero, in the vicinity of intermittent Cerknica Lake. The Stržen is one of the main streams of the lake, flowing through this karst region and frequently forming seasonal floodplains. The banks of the Stržen River host numerous other plant species, mainly amphibious macrophytes, due to the constant water level fluctuation, creating a dynamic environment ideal for their growth. Some of the species of amphibious macrophytes with the highest abundance, which had already been recorded by Kržič et al. (2007), and were confirmed by our observations, are *Myosotis scorpioides*, *Nuphar luteum*, *Ranunculus trichophyllus*, *Rorippa amphibia* and *Schoenoplectus lacustris*.

Riccia cavernosa appeared in considerable abundance at the locality, covering entire sections of the riverbank (Figure 2), which is characteristic of the species when water level drops and its ecological requirements are met. Some field observations suggest that its spores can remain viable for several years (Blockeel et al., 2014). It appears that the current conditions are favourable for its growth, as the species is well adapted to fluctuations in water levels, typical of the area around Cerknica Lake and the Stržen River. However, excessive overgrowth of the riverbank could potentially threaten *R. cavernosa*.

Funding

This work was supported by the Slovenian Research Agency (ARIS) through the programme group P1-0212 and ARIS Young research grant (Ž. Lobnik Cimerman).



Figure 2. *Riccia cavernosa* growing on humid sandy soil (photo: L. Štampar).

Armadillo officinalis Duméril, 1816, fam. Armadillidae (animal)

Author(s)	Miloš Vittori
Corresponding author	Miloš Vittori (milos.vittori@bf.uni-lj.si)
Leg.	(1,2) Miloš Vittori (3) Barbara Breznik, Barbora Ďurajková, Miloš Vittori
Country	Slovenia
Statement of significance	New records of a species considered possibly extinct in Slovenia
Locality description	(1) Sečovlje, Fontanigge, elevation 2 m.a.s.l. (2) Piran, by the Walls of Piran, elevation 35 m.a.s.l. (3) Sečovlje, Fontanigge, by the Museum of Salt Making, elevation 2 m.a.s.l.
Habitat	(1) Mediterranean halophilous scrub (2) Paved street (3) Mediterranean halophilous scrub
Date of observation	(1) 2023-09-21 (2) 2023-09-23 (3) 2024-03-30
Geographical coordinates	(1) N 45.47202°, E 13.6034° (2) N 45.52688°, E 13.57058° (3) N 45.47636°, E 13.59347°
Voucher	Six specimens collected in Piran are kept in the isopod collection of Miloš Vittori, University of Ljubljana, Biotechnical Faculty, Department of Biology, Večna pot 111, 1000 Ljubljana, Slovenia. Individuals observed at Fontanigge were not collected and were photographed instead.

The pill bug *Armadillo officinalis* Duméril, 1816 was first recorded on the territory of Slovenia in Škocjan near Koper in July 1926 (Strouhal, 1929). This record was the basis for the inclusion of the species in checklists of the Slovenian terrestrial isopod fauna (Potočnik, 1989; Vittori et al., 2023), but the species was not recorded in Slovenia again for nearly a century. Investigations of the terrestrial isopod fauna of the Slovenian coast in the 1970s and 1980s did not detect *A. officinalis* (Potočnik, 1984). As a result, the species was first considered endangered (Potočnik, 1992), and later, as efforts to find it had failed, possibly extinct in Slovenia (Potočnik, 1996). Despite this, it was not assigned a red list status in the national Red list of Malacostraca (Ur. l. RS., 2002).

The first recent observation was of a single isopod under a wooden board at the salt pans at Fontanigge in September 2023 (Figure 3A). Two days later, more than ten individuals were observed near the Walls of Piran, again under a wooden board. Six isopods found there were collected and preserved for further examination (Figure 3B). A third observation occurred at Fontanigge in March 2024. This time, more than ten individuals were observed under wooden pallets near the Museum of Salt Making (Figure 3C).

Species of the genus *Armadillo* are capable of rolling into a ball, with the flat protopodites of the uropods completing the outline of the pleon, and the uropod exopodites reduced to small cones that insert dorsally (Figure 3B). The genus is further characterized by monospiracular lungs on all pleopod exopodites and by modifications of pereopods 4 and 5 that enable these isopods to stridulate (Schmalfuss, 1996; Taiti et al., 1998; Cividini et al., 2020). While several species of *Armadillo* have been described from the Eastern Mediterranean, North Africa, and the Iberian Peninsula, *A. officinalis* is the only widespread Mediterranean species (Schmalfuss, 2003). It can be distinguished on the basis of the shape of the uropod protopodites and the pleotelson, the smoothness of the tergites, and male characters, mainly the shape of pereopod 7 and the exopodite of pleopod 1 (Schmalfuss, 1996).

The consistent presence of these isopods suggests that the population of *A. officinalis* in Slovenia may be recovering, with climate change possibly contributing to its success. Sket (2003) considered the species to be expanding its range, aided by human activity. Nevertheless, its recorded distribution in the country remains limited to the immediate proximity of the coast.

Acknowledgement

This work was supported by University Infrastructural Centre “Microscopy of Biological Samples” at the Biotechnical Faculty, University of Ljubljana.

Funding

This research received no external funding.

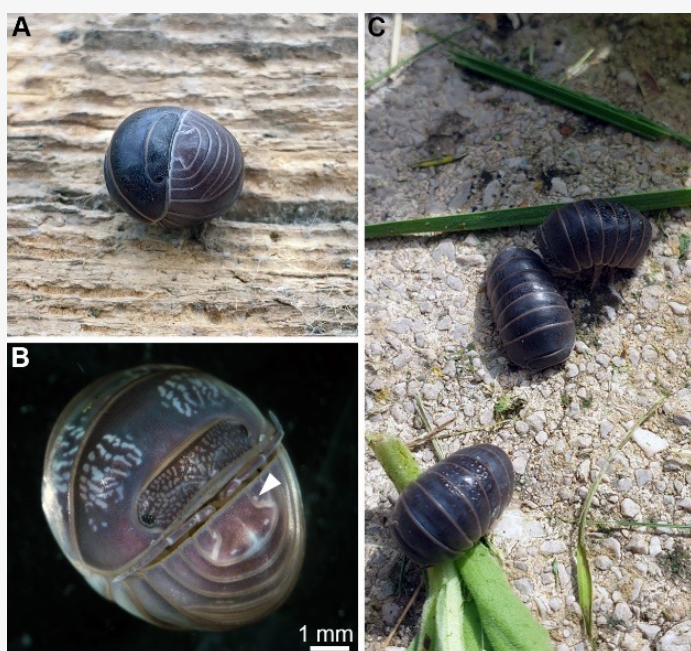


Figure 3. *Armadillo officinalis*. A: The individual observed at Fontanigge in September 2023. B: One of the specimens collected in Piran in September 2023. The uropod protopodites complete the outline of the pleon and the uropod exopodites are diminutive (arrow-head). C: Individuals photographed at Fontanigge in March 2024. (photos A, B, C: Miloš Vittori).

Plecotus macrobullaris Kuzyakin, 1965 (Chiroptera, Mammalia)
(bats, mammals)

Author(s)	Dren Dolničar
Corresponding author	Dren Dolničar (dren.dolnicar@gmail.com)
Leg.	Dren Dolničar
Country	Slovenia
Statement of significance	The highest elevation of recorded roost site for this species in Slovenia.
Locality description	Triglav National Park, Komna plateau, 1515 m a.s.l.
Habitat	An alpine meadow below the tree line, with a roost site in a wooden barn.
Date of observation	2024-07-11
Geographical coordinates	N 46.287972°, E 13.763278°
Voucher	/

On 11 July 2024, I found 2 individuals of *Plecotus* in the space between the planks and beams of the barn (WGS 84: 46.287972° N, 13.763278° E; Figure 4) next to the mountain hut Koča pod Bogatinom (address: Ukanc 148), on the Komna plateau, at 1515 m a.s.l. One was too far away to determine the species, while the other one, which was closer, I was able to identify as *Plecotus macrobullaris* based on the characteristic inverted triangular shape of the lower lip (Dietz & Kiefer, 2016). The bat, identified as *P. macrobullaris*, was initially positioned much closer to the edge of the gap between the barn’s planks (Figure 4B), with its dark greyish triangular lower lip (Dietz & Kiefer, 2016) clearly visible. However, it retreated deeper into the gap after we disturbed it with light while attempting to photograph it.

The record is the highest roost of this species in Slovenia, since the previously highest elevation known roost was in the church sv. Duha in Podolševa at 1250 m a.s.l. (Presetnik et al., 2023). It is the third highest observation overall, as the highest published record originates from the mist netting at Planina pri Jezeru at 1750 m a.s.l. (Alberdi et al., 2013; CKFF, 2024) and the second highest is an ultrasound recording from Planina Krstenica at 1670 m a.s.l. (A. Zamolo, personal communication, August 28, 2024). According to the general species vertical distribution, the finding of *P. macrobularis* at this altitude on Komna is not surprising. The species is common in the Alpine regions and is found in all the main mountain ranges of the western Palearctic, stretching from the Pyrenees to the Middle East, and is distributed at altitudes ranging from sea level to 2800 m a.s.l. (Alberdi et al., 2013). The scarcity of observations of *P. macrobullaris* in Slovene montane belt (CKFF, 2024) therefore indicates a lack of research in the Slovenian high mountains.

Acknowledgement

I would like to thank Primož Presetnik for gathering and sharing the relevant data about *P. macrobullaris* in Slovenia and for reviewing the first draft of this article and Aja Zamolo for sharing her records of this species. I would also like to thank Simona Strgulc Krajšek for sharing her photograph of *P. macrobullaris* that she took when I found it in the barn.

Funding

This research received no external funding.



Figure 2. A) *Plecotus macrobullaris*; B) the roosting place; C) the barn near the hut Koča pod Bogatinom on Komna, where at least two *Plecotus* bats were roosting (photo: A: Simona Strgulc Krajšek; B, C: Dren Dolničar).

References

- Alberdi, A., Garin, I., Aizpurua, O., Aihartza, J., 2013. Review on the Geographic and Elevational Distribution of the Mountain Long-Eared Bat *Plecotus macrobullaris*, Completed by Utilising a Specific Mist-Netting Technique. *Acta Chiropterologica* 15(2): 451–461. <https://doi.org/10.3161/150811013X679071>.
- Blockeel, T. L., Bosanquet, S. D. S., Hill, M. O., Preston, C. D. (eds.), 2014. Atlas of British and Irish bryophytes: the distribution and habitat of mosses and liverworts in Britain and Ireland. Pisces Publications on behalf of the British Bryological Society.
- Casas, C., Brugués, M., Cros, R. M., & Sérgio, C., 2006. Handbook of Mosses of the Iberian Peninsula. p. 311.
- Cividini, S., Sfenthourakis, S., Montesanto, G., 2020. Are terrestrial isopods able to use stridulation and vibrational communication as forms of intra and interspecific signaling and defense strategies as insects do? A preliminary study in *Armadillo officinalis*. *The Science of Nature*, 107(1), 4. <https://doi.org/10.1007/s00114-019-1656-3>.
- CKFF, 2024. *Plecotus macrobullaris*. Database of Center za kartografijo favne in flore, Miklavž na Dravskem polju. (July 2024, prepared by Primož Presetnik).
- Dietz, C., Kiefer, A., 2016. Bats of Britain and Europe. Bloomsbury USA.
- Ellis, L. T., Afonina, O. M., Czernyadjeva, I. V., Alegro, A., Šegota, V., Boiko, M., Zagorodniuk, N., Burghardt, M., Alataş, M., Aslan, G., Batan, N., Dragičević, S., Erata, H., Kirmaci, M., Özenoğlu, H., Evangelista, M., Valente, E. B., Feletti, T. A., Ezer, T., Fedosov, V. E., Fuertes, E., Oliván, G., Natcheva, R., Gospodinov, G., Hodgson, A., Kiebacher, T., Köckinger, H., von Konrat, M., Strgulc Krajšek, S., L. Cimerman, Ž., Kučera, J., Mikulášková, E., Müller, F., Muñoz, J., Ochrya, R., Peralta, D. F., Philippe, M., Porley, R. D., Rawat, K. K., Paul, R. R., Ros, R., Werner, M., O., Schäfer-Verwimp, A., Sérgio, C., Shkurko, A. V., Söderström, L., de Souza, A. M., Spitale, D., Ștefănuț, S., Tabua, M., Winter, G., 2022. New national and regional bryophyte records, 69, *Journal of Bryology*, 44:1, 87–102. <https://doi.org/10.1080/03736687.2022.2061242>.
- Frey, W., Frahm, J. P., Fischer, E., Lobin, W., Blockeel, T. L. (eds.), 2006. The Liverworts, Mosses and Ferns of Europe. Harley Books, Essex, 512 pp.
- Hill, M. O., Preston, C. D., 1998, The geographical relationships of British and Irish bryophytes, *Journal of Bryology*, 20:1, 127–226, <https://doi.org/10.1179/jbr.1998.20.1.127>.
- Hill, M. O., Preston, C. D., Bosanquet, S. D. S., & Roy, D. B., 2007. BRYOATT : attributes of British and Irish mosses, liverworts and hornworts. Centre for Ecology and Hydrology.
- Hodgetts, N. G., Lockhart, N., 2020. Checklist and country status of European bryophytes – update 2020. – Irish Wildlife Manuals 123. – Dublin: Department of Culture, Heritage and the Gaeltacht, 224 pp.
- Hodgetts, N. G., Söderström, L., Blockeel, T. L., Caspari, S., Ignatov, M. S., Konstantinova, N. A., Lockhart, N., Papp, B., Schröck, C., Sim-Sim, M., Bell, D., Bell, N. E., Blom, H. H., Bruggeman-Nannenga, M. A., Brugués, M., Enroth, J., Flatberg, K. I., Garilleti, R., Hedenäs, L., Holyoak, D. T., Hugonnot, V., Kariyawasam, I., Köckinger, H., Kučera, J., Lara, F., Porley, R. D., 2020. An annotated checklist of bryophytes of Europe, Macaronesia and Cyprus. *Journal of Bryology* 42: 1–116.

Hodgetts, N., Cáliz, M., Englefield, E., Fettes, N., García Criado, M., Patin, L., Nieto, A., Bergamini, A., Bisang, I., Baisheva, E., Campisi, P., Cogoni, A., Hallingbäck, T., Konstantinova, N., Lockhart, N., Sabovljević, M., Schnyder, N., Schröck, C., Sérgio, C., Sim Sim, M., Vrba, J., Ferreira, C. C., Afonina, O., Blockeel, T., Blom, H., Caspari, S., Gabriel, R., Garcia, C., Garilleti, R., González Mancebo, J., Goldberg, I., Hedenäs, L., Holyoak, D., Hugonnot, V., Huttunen, S., Ignatov, M., Ignatova, E., Infante, M., Juutinen, R., Kiebach, T., Köckinger, H., Kučera, J., Lönnell, N., Lüth, M., Martins, A., Maslovsky, O., Papp, B., Porley, R., Rothero, G., Söderström, L., Ștefănuț, S., Syrjänen, K., Untereiner, A., Váša, J., Vanderpoorten, A., Vellak, K., Aleffi, M., Bates, J., Bell, N., Brugués, M., Cronberg, N., Denyer, J., Duckett, J., During, H. J., Enroth, J., Fedosov, V., Flatberg, K. I., Ganeva, A., Gorski, P., Gunnarsson, U., Hassel, K., Hespanhol, H., Hill, M., Hodd, R., Hylander, K., Ingerpuu, N., Laaka-Lindberg, S., Lara, F., Mazimpaka, V., Mežaka, A., Müller, F., Orgaz, J. D., Patino, J., Pilkington, S., Puche, F., Ros, R. M., Rumsey, F., Segarra-Moragues, J. G., Seneca, A., Stebel, A., Virtanen, R., Weibull, H., Wilbraham, J., Żarnowiec, J., 2019. A miniature world in decline: European Red List of Mosses, Liverworts and Hornworts. IUCN, Brussels. <https://doi.org/10.2305/IUCN.CH.2019.ERL.2.en>.

Lobnik Cimerman, Ž., Kopitar, D., Strgulc Krajšek, S., 2023. Arable bryophytes from Northeastern Slovenia with new and interesting national records. *Botanica Serbica* 47(2): 301–308. <https://doi.org/10.2298/BOTSERB2302301C>.

Long, D., 2010. *Riccia cavernosa*, Cavernous Crystalwort. In: Atherton, I., Bosanquet, S., Lewley, M. (eds.), *Mosses and Liverworts of Britain and Ireland, a field guide*. British Bryological Society, p 263.

Martinčič, A., 2016. Updated Red List of bryophytes of Slovenia. *Hacquetia*, 15(1), 107–126. <https://doi.org/10.1515/hacq-2016-0006>.

Martinčič, A., 2024. New checklist and the Red list of the hornworts (Anthocerotophyta) and liverworts (Marchantiophyta) of Slovenia. *Hacquetia* 23 (2): 175–197. <https://doi.org/10.2478/hacq-2023-0013>.

Martinčič, A., 2024. New Checklist and the Red list of the mosses (Bryophyta) of Slovenia. *Hacquetia*, 23(1), 69–118. <https://doi.org/10.2478/hacq-2023-0006>.

Müller, J., 2016. Einwanderung von *Cryphaea heteromalla* (Hedw.) D. Mohr nach Berlin und Brandenburg. *Veröffentlichungen Des Naturkundemuseums Potsdam* 2: 37–43.

Paton, A. J., 1999. *The liverwort flora of the British Isles*. Colchester: Harley Books.

Potočnik, F., 1984. Mokrice (Isopoda terrestria) slovenske obale Jadrana. *Biološki vestnik*, 32(1), 77–86.

Potočnik, F., 1989. The survey of the fauna of woodlice (Isopoda terrestria) of Yugoslavia. *Biološki vestnik*, 37, 61–82.

Potočnik, F., 1992. The red list of endangered Isopoda terrestria (Crustacea) in Slovenia. *Varstvo narave*, 17, 157–164.

Potočnik, F., 1996. Mokrice (Isopoda Terrestria). In: Gregori J, Martinčič A, Tarman K, Urbanc-Berčič O, Tome D, Zupančič M (eds.): *Narava Slovenije, stanje in perspektive*. Društvo ekologov Slovenije, Ljubljana, pp. 247–251.

Presetnik, P., Zamolo, A., Grgurevič, S., Šalamun, A., 2023. Monitoring populacij izbranih ciljnih vrst netopirjev v letih 2021–2023. Končno poročilo. Center za kartografijo favne in flore, Miklavž na Dravskem polju. 212 str., digitalne priloge. [Naročnik: Ministrstvo za naravne vire in prostor, Ljubljana].

Preston, C., 2010. *Cryphaea heteromalla*, Lateral Cryphaea. In: Atherton, I., Bosanquet, S., Lewley, M. (eds.), *Mosses and Liverworts of Britain and Ireland, a field guide*. British Bryological Society, p 672.

Schmalfuss, H., 1996. The terrestrial isopod genus *Armadillo* in Western Asia (Oniscidea: Armadillidae), with descriptions of five new species. *Stuttgarter Beiträge zur Naturkunde, Serie A*, 544.

Schmalfuss, H., 2003. World catalog of terrestrial isopods (Isopoda: Oniscidea). *Stuttgarter Beiträge zur Naturkunde, Serie A*, 654.

Sket, B., 2003. Raki – Crustacea. In: Sket B, Gogala M, Kuštor V (eds.): *Živalstvo Slovenije. Tehniška založba Slovenije*, Ljubljana, pp. 188–224.

Šraj-Kržič, N., Germ, M., Urbanc-Berčič, O., Kuhar, U., Janauer, G. A., Gaberščik, A., 2007. The Quality of the Aquatic Environment and Macrophytes of Karstic Watercourses. *Plant Ecology* 192(1): 107–118.

Strgulc Krajšek, S., Gey, S., Cezanne, R., Eichler, M., 2024. Report on the annual excursion of BLAM to Slovenia from September 13th to 17th, 2023. *Herzogiella* 11: 13–26.

Strouhal, H., 1929. Die Landisopoden des Balkans. 3. Beitrag: Südbalkan. *Zeitschrift für wissenschaftliche Zoologie*, 133, 57–120.

Taiti, S., Paoli, P., Ferrara, F., 1998. Morphology, biogeography, and ecology of the family Armadillidae (Crustacea, Oniscidea). *Israel Journal of Zoology*, 44, 291–301.

Ur. I. RS., 2002. Pravilnik o uvrstitvi ogroženih rastlinskih in živalskih vrst v rdeči seznam. Uradni list RS, no. 82/02, 42/10.

Vittori, M., Mavrič, B., Pekolj, A., Govedič, M., Zagmajster, M., 2023. A checklist of isopods (Crustacea: Isopoda) in Slovenia. *Natura Sloveniae*, 25(2), 27–52. <https://doi.org/10.14720/ns.25.2.27-52>.