Clarifying the presence of *Pseudosuccinea columella* (Say, 1817) (Gastropoda: Hygrophila: Lymnaeidae) in Serbia

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GOJŠINA V. & VUJIĆ M., 2024: Clarifying the presence of *Pseudosuccinea columella* (Say, 1817) (Gastropoda: Hygrophila: Lymnaeidae) in Serbia. – Malacologica Bohemoslovaca, 23: 107–110. https://doi.org/10.5817/MaB2024-23-107 Publication date: 12. 11. 2024. This work is licensed under the Creative Commons Attribution 4.0 Public License.

We report the first record of *Pseudosuccinea columella* (Say, 1817) from Serbia. This finding in the Tamiš River clarifies its presence in Serbia which was questioned in the 2021 checklist, as it was previously confused with succineid gastropods. The habitat is described in detail and its possible way of introduction is discussed.

Key words: freshwater gastropods, non-native species, aquaristics

Introduction

Pseudosuccinea columella (Say, 1817) is a lymnaeid freshwater gastropod that is native to North America but has been introduced to South America, Africa, Europe and the Pacific region (LOUNNAS et al. 2017). The species is known to occur in thermal waters and greenhouses in Europe and its spread is often associated with aquaristics and the transport of aquatic plants (GLÖER 2019). It has been documented in various outdoor locations, including Hungary (PINTÉR & SUARA 2004), Austria, Greece (REISCHÜTZ & REISCHÜTZ 2004, WELTER-SCHULTES 2012), France (POINTIER et al. 2007), Portugal (HOLYOAK et al. 2019) and Romania (GLÖER & SIRBU 2005). It is known to occur indoors in Slovakia (FLASAR & KROUPOVÁ 1976, ČEJKA et al. 2007). In Czechia it can be found in greenhouses (Horsák et al. 2004, BERAN 2022) and also outdoors. It was thought that it can not survive winter in Czechia outdoors (Horsák et al. 2013, BERAN 2022). However this alien species is established already in Bohemia at least on three sites since 2013-2016 (BERAN et al. 2023, Horsák et al. 2024). It is also known from other countries, although it is unclear whether this refers to solely indoor or outdoor habitats: Switzerland (TURNER et al. 1998), Latvia (CORDEIRO & BOGAN 2012), Germany, Spain, Italy, and Austria (BANK & NEUBERT 2017, GLÖER 2019). GLÖER (2019) also reported some occurrences in Sweden, Ukraine (possibly a mistake, maybe referring to Romania), the Netherlands and Albania, but without further information.

The shell shape of *P. columella* is generally similar to the terrestrial gastropods of the family Succineidae, but the species has a distinctive shell surface sculpture in the form of strong spiral striae (WELTER-SCHULTES 2012).

The presence of *P. columella* in Serbia was discussed for the first time by MARKOVIĆ et al. (2021) who stated that this species does not occur in Serbia despite some recent reports that apparently referred to succineid gastropods (B. NOVAKOVIĆ pers. comm.). However, the authors also stated that given the species' current distribution, it would not be surprising if this species was also present in Serbia. In this paper, we confirm the presence of this species in Serbia by reporting a population from the Tamiš River in the city of Pančevo.

Material and Methods

Sampling was conducted on the left bank of the Tamiš River, at the Tamiš Quay (Fig. 1) in the city of Pančevo (44.8697N, 20.6339E) on October 16 2024. Snails were collected manually from branches floating in the water or with a hand net pulled through the aquatic vegetation. They were fixed directly in 70% ethanol and stored in plastic bottles. Shells were photographed using a Nikon SMZ800N stereomicroscope equipped with a Nikon DS-Fi2 camera. All collected specimens are stored at the Institute of Zoology, Faculty of Biology, Belgrade (IZOO).

Results

Specimens examined exhibited the shell morphology typical of the species. Shells were thin, dark brown with a strongly enlarged body whorl reminiscent of the one found in succineid snails. The shell surface was ornamented with strong and dense spiral striae occasionally crossed by an almost equally developed radial growth lines (Fig. 2). Fourteen specimens were found during a period of high water level, mainly on the leaves of aquatic and submerged plants, floating branches, and logs, and out of the water on river deposits. The riverbed at the sampling site is heterogeneous, composed of coarse and fine gravel, with a significant proportion of silt and organic matter. The community of submerged aquatic vegetation was not observed due to high water levels, but most likely it consists mainly of Ceratophyllum demersum, which was abundant in the deposits. The floating vegetation at the site consists of Lemna minor, Spirodela polyrhiza, Trapa natans, Salvinia natans, and Nuphar lutea. The specimens themselves were found in the submerged material of the invasive water finger-grass Paspalum distichum, densely covered with algae. As the habitat is located on the city's shore and represents an urban quay, the anthropogenic impact is very pronounced, reflected in the channelling of part of the river, the existence of a beach, a marina for boats, and rafts, and in water pollution from waste. We have also observed hundreds of Physa acuta Draparnaud, 1805 at the site.

Discussion

Pseudosuccinea columella is known to be an intermediate host for the common liver fluke (Fasciola hepatica Linnaeus, 1758) and can therefore contribute to the spread of its infective stages, which cause fascioliasis (MARTÍN et al. 2016, LOUNNAS et al. 2017). It is also known to be a threat to native lymnaeids, as reported from France (VIGNOLES et al. 2018). The spread of the species is often associated with the transport of aquatic plants. The species is known to occur in thermal waters and greenhouses, but cannot overwinter in Central Europe due to low temperatures (WELTER-SCHULTES 2012). The species is known to survive winters in France (VIGNOLES et al. 2018). We believe that its occurrence in the Tamiš River in Serbia is also related to aquaristics and the transport of aquatic plants and the specimens probably entered the river through the disposal of aquariums or the release of aquatic plants. Likely, this species is already present in some thermal waters or greenhouses in Serbia. The species is not very abundant in the habitat as only fourteen specimens were collected.

Acknowledgement

This study was financially supported by the Serbian Ministry of Science, Technological Development and Innovation (Contract No. 451-03-66/2024-03/200178).

References

- BANK R. A. & NEUBERT E., 2017: Checklist of the land and freshwater Gastropoda of Europe. – Online at https://www.molluscabase.org/aphia.php?p=sourcedetails&id=279050, last update July 16, 2017, accessed October 16, 2024, 170 pp.
- BERAN L., 2022: Supplement to the knowledge of aquatic molluscs of greenhouses in the Czech Republic. – Folia Malacologica, 30(2): 93– 98. https://doi.org/10.12657/folmal.030.013
- BERAN L., ČEJKA T., ADAMCOVÁ T., COUFAL R., ČAČANÝ J., HORÁČKOVÁ J., JUŘIČKOVÁ L., PODROUŽKOVÁ Š., ŘÍHOVÁ D., ŠLACHTOVÁ E. & HORSÁK M., 2023: Malacological news from the Czech and Slovak Republics in 2022. – Malacologica Bohemoslovaca, 22: 37–47. https://doi.org/10.5817/MaB2023-22-37

- CORDEIRO J. & BOGAN A., 2012: *Pseudosuccinea columella.* – The IUCN Red List of Threatened Species 2012: e.T156043A739967. Accessed on October 17, 2024. https://doi. org/10.2305/IUCN.UK.2012-1.RLTS.T156043A739967.en
- ČЕЈКА Т., DVOŘÁK L., HORSÁK M. & ŠTEFFEK J., 2007: Checklist of the molluscs (Mollusca) of the Slovak Republic. – Folia Malacologica, 15: 49–58. https://doi.org/10.12657/folmal.015.005
- FLASAR I. & KROUPOVÁ V., 1976: Die Malakofauna der Gewächshäuser in Bratislava (Tschechoslowakei) [The malacofauna of greenhouses in Bratislava (Czechoslovakia)].
 Malakologische Abhandlungen, 5(1): 139–154. (in German)
- GLÖER P., 2019: The freshwater gastropods of the West-Palaearctis, Volume 1. – Hetlingen, Biodiversity Research Laboratory, 399 pp.
- GLÖER P. & SîRBU I., 2005: New freshwater molluscs species found in the Romanian fauna. Heldia, 6(5/6): 229–238.
- HOLYOAK D. T., HOLYOAK G. A. & MENDES R., 2019: A revised check-list of the land and freshwater Mollusca (Gastropoda and Bivalvia) of mainland Portugal. – Iberus, 37(1): 113–168.
- HORSÁK M., ČEJKA T., JUŘIČKOVÁ L., BERAN L., HORÁČKOVÁ J., DVOŘÁK L., COUFAL R., MAŇAS M. & HORSÁKOVÁ V., 2024: Check-list and distribution maps of the molluscs of the Czech and Slovak Republics. – Online at http://mollusca.sav.sk/malacology/checklist.htm, checklist updated at November 8, 2024, maps updated at November 8, 2024. https://doi.org/10.5281/ zenodo.14057679
- HORSÁK M., DVOŘÁK L. & JUŘIČKOVÁ L., 2004: Greenhouse gastropods of the Czech Republic: current stage of research. – Malakológiai Tájékoztató, 22: 141–147.
- HORSÁK M., JUŘIČKOVÁ L. & PICKA J., 2013: Měkkýši České a Slovenské republiky. Molluscs of the Czech and Slovak Republics. – Kabourek, Zlín, 264 pp. ISBN 978-80-86447-15-5 (in Czech and English)
- LOUNNAS M., CORREA A. C., VÁZQUEZ A. A., DIA A., ESCO-BAR J. S., NICOT A, ARENAS J., AYAQUI R., DUBOIS M. P., GIMENEZ T., GUTIÉRREZ A., GONZÁLEZ-RAMÍREZ C., NOYA O., PREPELITCHI L., URIBE N., WISNIVESKY-COLLI C., YONG M., DAVID P., LOKER E. S., JARNE P., POINTIER J. P. & HURT-REZ-BOUSSÈS S., 2017: Self-fertilization, long-distance flash invasion and biogeography shape the population structure of *Pseudosuccinea columella* at the worldwide scale. – Molecular Ecology, 26(3): 887–903. https://doi.org/10.1111/mec.13984
- MARKOVIĆ V., GOJŠINA V., NOVAKOVIĆ B., BOŽANIĆ M., STO-JANOVIĆ K., KARAN ŽNIDARŠIĆ T. & ŽIVIĆ I., 2021: The freshwater molluscs of Serbia: Annotated checklist with remarks on distribution and protection status. – Zootaxa, 5003(1): 1–64. https://doi.org/10.11646/zootaxa.5003.1.1
- MARTÍN P. R., OVANDO X. M. C. & SEUFFERT M. E., 2016: First record of the freshwater snail *Pseudosuccinea columella* (Gastropoda: Lymnaeidae) in southern Pampas (Argentina) and assessment of future spread. Molluscan Research, 36(3): 213–221. https://doi.org/10.1080/13235818.2015.1128602
- PINTÉR L. & SUARA R., 2004: Magyarországi puhatestűek katalógusa hazai malakológusok gyűjtései alapján [Catalogue of the Hungarian molluscs based on the collectings of Hungarian malacologists]. – In: FEHÉR Z. & GUBÁNYI A. (eds) A magyarországi puhatestűek elterjedése [Distribution of the Hungarian molluscs] II. – Magyar Természettudományi Múzeum, Budapest, 547 pp. (in Hungarian)
- POINTIER J. P., COUSTAU C., RONDELAUD D. & THERON A., 2007: *Pseudosuccinea columella* (Say 1817) (Gastropoda, Lymnaeidae), snail host of *Fasciola hepatica*: first record for France in the wild. – Parasitology Research, 101(5): 1389–1392. https:// doi.org/10.1007/s00436-007-0656-y
- REISCHÜTZ A & REISCHÜTZ P. L., 2004: Helleniká pantoia, 10: Pseudosuccinea columella (Say, 1817) im Nomos Florina

(NW-Makedonien, Griechenland) [Helleniká pantoia, 10: *Pseudosuccinea columella* (Say, 1817) in Nomos Florina (NW Macedonia, Greece)]. – Nachrichtenblatt der Ersten Vorarlberger Malakologischen Gesellschaft 125: 9. (in German)

- TURNER H., KUIPER J. G. J., THEW N., BERNASCONI R., RÜETSCHI J., WÜTHRICH M. & GOSTELI M., 1998: Atlas der Mollusken der Schweiz und Liechtensteins [Atlas of the Molluscs of Switzerland and Liechthenstein]. Fauna Helvetica 2, Neuchatel, 527 pp. (in German)
- VIGNOLES P., DREYFUSS G. & RONDELAUD D., 2018: Consequences of invasion by *Pseudosuccinea columella* on the dynamics of native lymnaeids living on the acid soils of central France. – Molluscan Research, 38(4): 287–295. https://doi.org/ 10.1080/13235818.2018.1423866
- WELTER-SCHULTES F. W., 2012: European non-marine molluscs, a guide for species identification. – Planet Poster Editions, Göttingen, 674 pp.



Fig. 1. Habitat of *Pseudosuccinea columella* in the city of Pančevo, the Tamiš River.



Fig. 2. Shell of *Pseudosuccinea columella* from the city of Pančevo, the Tamiš River. A–D, shell; E, enlarged view of the shell surface sculpture.