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Distribution of *Bithynia leachii* (Sheppard, 1823) and *Bithynia troschelii* (Paasch, 1842) (Gastropoda: Bithyniidae) in the Czech Republic

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This paper summarises all known data about the occurrence and distribution of *Bithynia leachii* (Sheppard, 1823) and *Bithynia troschelii* (Paasch, 1842) in the Czech Republic. Both species were already recorded from the Czech Republic in the past, but they were not distinguished. Autochthonous occurrence of both species is restricted to South Moravia; in the floodplains along the Morava River and the Dyje River where both species are very rare. *Bithynia troschelii* was also found in other sites situated in Bohemia and northern Moravia but these occurrences are not indigenous.

Keywords: Mollusca, Gastropoda, *Bithynia leachii*, *B. troschelii*, distribution

Introduction

Bithynia leachii (Sheppard, 1823) and *B. troschelii* (Paasch, 1842) were not usually distinguished in the past as distinct species; *B. troschelii* was often considered either as a geographical subspecies of *B. leachii* or only as its bigger form (e.g. Glöer 2002a,b, Glöer & Meier-Brook 2003). Falniowski (1989) as early as suggested that *B. leachii* and *B. troschelii* should be viewed as distinct species, which was followed by Glöer & Fehér (2004) fifteen years later. Falkner et al. (2001) and Falkner (2003) proposed to use the name *B. transsilvanica* Bielz, 1852 for *B. troschelii*, nevertheless Glöer (2002b) and Glöer & Fehér (2004) clearly showed that *B. troschelii* is a valid name for this taxon.

In the Czech Republic *B. leachii* and *B. troschelii* were not distinguished in the past too (e.g. Ložek 1956) and the occurrence of both taxa together (mentioned as one species) was documented only from southernmost Moravia; surroundings of the villages of Lednice, Hlohovec, and Sedlec (see Beran & Horsák 1999) and from floodplain forests near Kostice and Tvrdonice villages (Beran & Horsák 1998). For several older data (Nezvalová 1970, Kotolanová 1971, Balůsek & Vojtek 1973, Ditrich & Vojtek 1977, Coufalová 1991) there are no voucher materials available, so it was not possible to decide which species was found. Luckily most of these records comes from sites where the material exists from other surveys. Data until 2000 are summarised in Beran (2002).

Material and methods

Most of the data used in this study are from the ancient author's database with more than 47 000 records of aquatic molluscs in the Czech Republic. The majority of them were obtained by field research during the previous 12 years. The remainder comes from the Czech museum collections, published papers, and unpublished records of other researchers. Since these two species were not distinguished in the past, only those data where voucher specimens were available could be taken into consideration.

The main sampling method for aquatic molluscs was to wash vegetation or sediments using a metal sieve (diameter 20 cm, mesh size 0.5–1 mm). This was combined with a search of various substrates present in the sites: stone, wood, and artificial surfaces (e.g. plastic bags and bottles). These methods were used also to collect material of *B. leachii* and *B. troschelii*. Specimens were determined according to their shells (including operculum, Fig. 1) (see Glöer & Fehér 2004) and furthermore specimens found in 2008 were killed and then fixed in 70% ethanol and then dissected and identified using their male copulatory organs (see Glöer & Fehér 2004).

Results and Discussion

Bithynia leachii (Sheppard, 1823)

Distribution in the Czech Republic: This species is known only from lowlands along the rivers of Morava and Dyje, and the area of their confluence in southernmost Moravia near the Czech-Slovak-Austrian frontier (Fig. 2).

Altitude: 150–174 m.

Habitats: Pools, oxbow lakes, wetlands, and small slowly flowing canals (also temporary).

Category in the Red list (Beran et al. 2005): Critically Endangered (CR).

List of known sites with the occurrence of *Bithynia leachii*. Data in the list are as follows: site number, geographical co-ordinates (http://www.mapy.cz/), code of the mapping grid for faunistic mapping (according to Pruner & Míka 1996), name of the nearest settlement, description of the

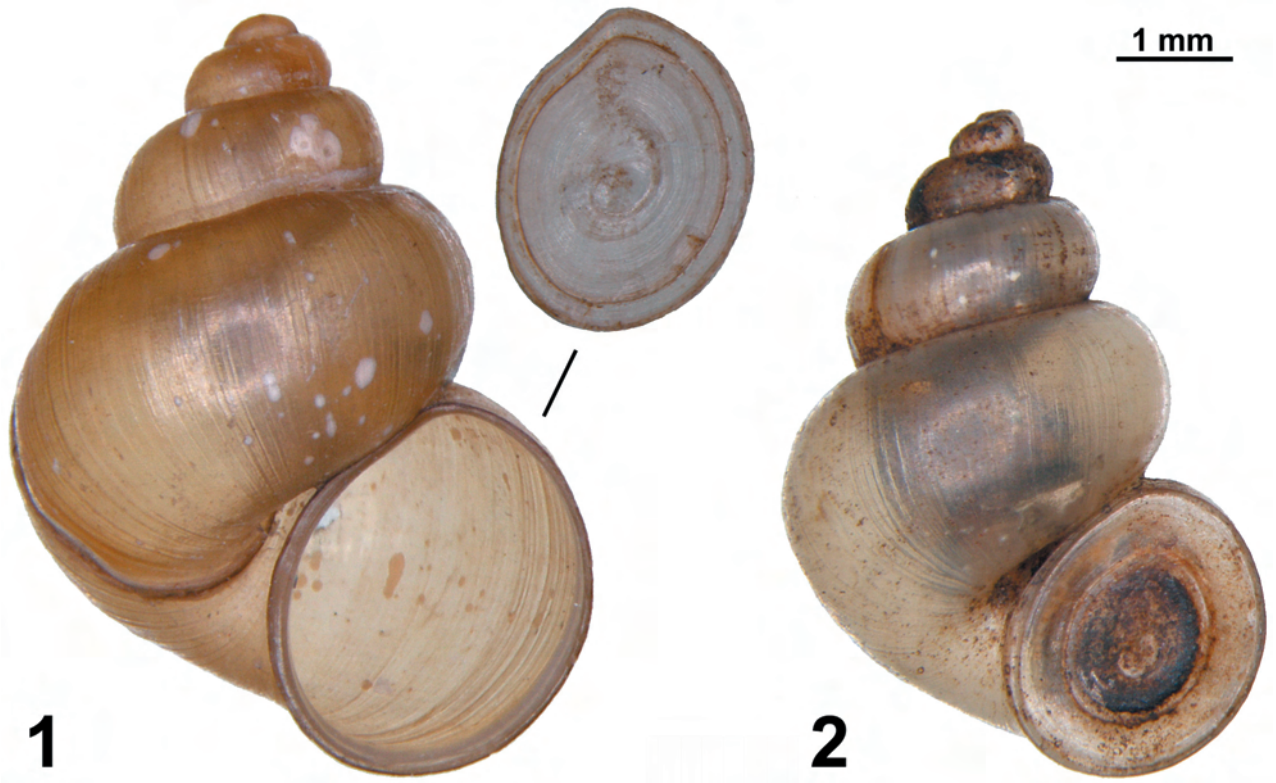

Fig. 1. Shells of *Bithynia troschelii* and *B. leachii*. 1 – *B. troschelii* and its operculum (material is from site no. 1), 2 – *B. leachii* (material is from site no. 11). Photo M. Horsák.

site, elevation (m a.s.l.), number of individuals (ex.), date of investigation, name of investigator. References of already published records are given. All samples were identified by L. Beran.

1 – 48°46'52"N, 16°45'34"E, 7266, Hlohovec, wetland on the fringe of the Hlohovecký Rybník pond, 174 m, 15 ex., 23 Mar 2008, L. Beran; **2** – 48°46'51"N, 16°45'34"E, 7266, Hlohovec, wetland on the fringe of the Hlohovecký Rybník pond, 174 m, **a)** 30 ex., 8 Apr 2007, L. Beran, **b)** 12 ex., 23 Mar 2008, L. Beran; **3** – 48°45'21"N, 17°0'28"E, 7268, Tvrdonice, a ditch crossing the new road on the forest margin, 156 m, 20 ex., 4 Oct 2001, L. Beran & M. Horsák; **4** – 48°45'19"N, 17°0'31"E, 7268, Tvrdonice, a ditch crossing the new road 50 m from the forest margin, 156 m, 70 ex., 4 Oct 2001, L. Beran & M. Horsák; **5** – 48°45'05"N, 17°01'04"E, 7268, Tvrdonice, a ditch crossing the new road 1 km from its crossing with Anglická Alej (English Alley), 156 m, 3 ex. 4 Oct 2001, L. Beran & M. Horsák; **6** – 48°44'58"N, 17°00'10"E, 7267, Tvrdonice, edge of pool in the Stibůrkovská Jezera Nature Reserve, 156 m, 12 ex., 22 Sep 2007, L. Beran; **7** – 48°44'55"N, 17°00'20"E, 7267, Tvrdonice, a pool on the eastern edge of the Stibůrkovská Jezera Nature Reserve, 156 m, 5 ex., 30 Sep 1997, Beran & Horsák (1998); **8** – 48°44'47"N, 16°59'51"E, 7267, Tvrdonice, a small and overgrown pool to the south of Stibůrkovská Jezera Nature Reserve, 156 m, 10 ex., 22 Sep 2007, L. Beran; **9** – 48°44'45"N, 16°59'46"E, 7267, Tvrdonice, an overgrown ditch to the south of the Stibůrkovská Jezera Nature Reserve, 156 m, 45 ex., 22 Sep 2007, L. Beran; **10** – 48°44'35"N, 17°00'06"E, 7267, Tvrdonice, a large pool in the southern part of the Stibůrkovská Jezera Nature Reserve, 156 m, 40 ex., 30 Sep 1997, Beran & Horsák (1998); **11** – 48°44'22"N, 16°59'35"E, 7268, Kostice, a pool connected with a ditch crossing the road on the edge of the forest to the northeast of Kostice, 156 m, 40 ex., 8 Sep 1997, Beran & Horsák (1998); **12** – 48°44'10"N, 16°59'40"E, 7268, Kostice, a pool on the edge of the forest 1 km to the east from Kostice, 156 m, 5 ex., 10 Sep 1997, Beran & Horsák (1998); **13** – 48°44'05"N, 17°00'00"E, 7268, Kostice, a ditch, 156 m, 5 ex., 30 Sep 1997, Beran & Horsák (1998); **14** – 48°44'00"N, 16°59'43"E, 7268, Kostice, a ditch and small pool in floodplain 1.8 km to the southeast from Kostický rybník Pond, 156 m, **a)** 10 ex., 30 Sep 1997, Beran & Horsák (1998), **b)** 2 ex., 10 Oct 2003, L. Beran, **c)** 45 ex., 22 Sep 2007, L. Beran; **15** – 48°41'33"N, 16°56'14"E, 7367, Lanžhot, small and shallow pool 2.2 km to the southeast from Lány castle, 150 m, 10 ex., 20 Apr 2008, L. Beran; **16** – 48°38'08"N, 16°55'55"E, 7367, Lanžhot, an overgrown sandpit near the road 1.8 km to the southeast of the confluence of the Kyjovka and Dyje Rivers, 150 m, 10 ex., 20 Apr 2008, L. Beran; **17** – 48°38'08"N, 16°55'56"E, 7367, Lanžhot, wetland near the sandpit near the road 1.8 km to the southeast of the confluence of the Kyjovka and Dyje Rivers, 150 m, 15 ex., 20 Apr 2008, L. Beran.

Bithynia troschelii (Paasch, 1842)

Distribution: Autochthonous occurrence of this species is known only from wetlands near the village of Lednice (sites no. 4 and 5) and from the pond of Nesyt (site no. 6) (Fig. 3). There are only four reliable records of native populations; for the first time documented in 1975 and after more than 30 years rediscovered again in 2008. This species is also known from other three sites scatter over the Czech Republic but these occurrences are not indigenous. Individuals of this species were probably transported with

aquatic plants to the Institute of Botany in Třeboň (site no. 3) where different aquatic plants are cultivated (Fig. 4). Origin of these individuals is not certainly known, but it is possible that they originate from the Neusiedler Lake (northern frontier between Austria and Hungary) since some of cultivated plants come from this site where this snail is still common. Subsequently this species could be transferred with aquatic plants from Třeboň to Štramberk Town (site no. 2) (M. Horsák, direct observation) and also to Průhonice Town (site no. 1).

Altitude: 173–434 m; but autochthonous occurrence is known only from altitude 170 and 173 m.

Habitats: Pools, oxbow lakes, and wetlands.

Category in the Red list (Beran et al. 2005): Regionally Extinct (RE) because autochthonous occurrence was not known untill 2008 when a small populations were found at the sites no. 4 and 6.

List of known sites with the occurrence of *Bithynia tro-*

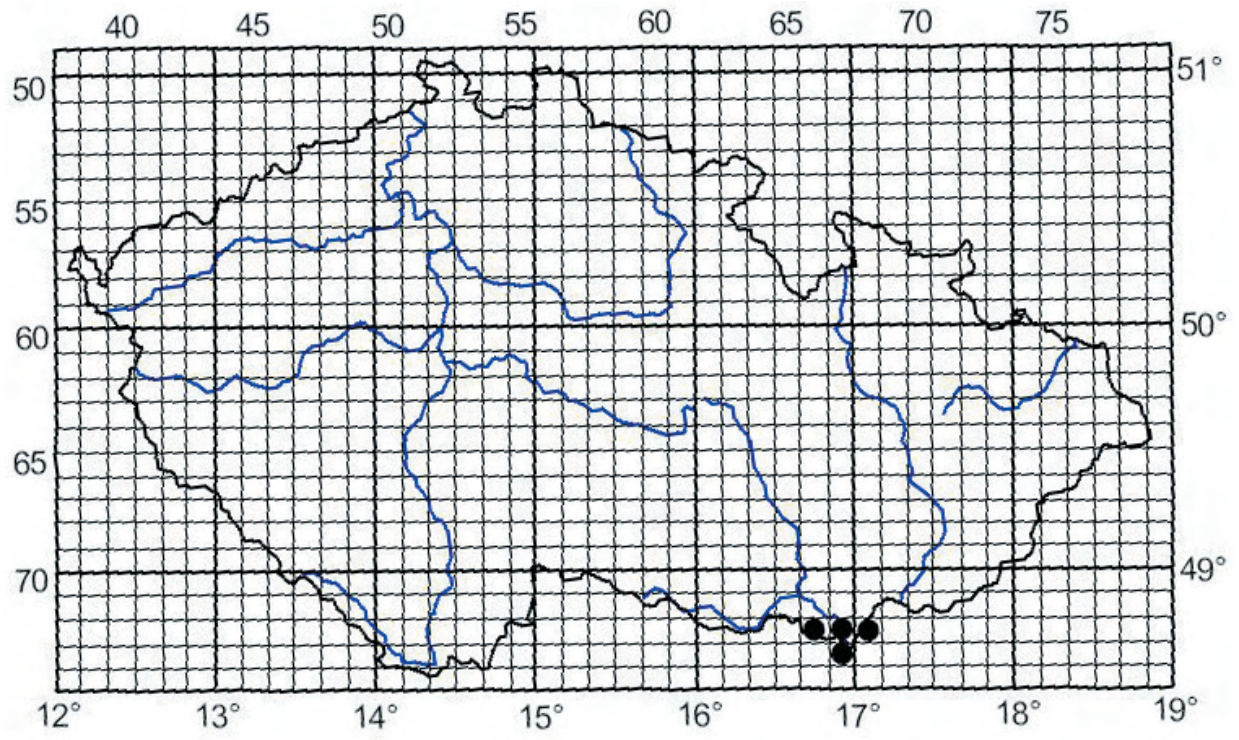

Fig. 2. Distribution of *Bithynia leachii* in the Czech Republic.

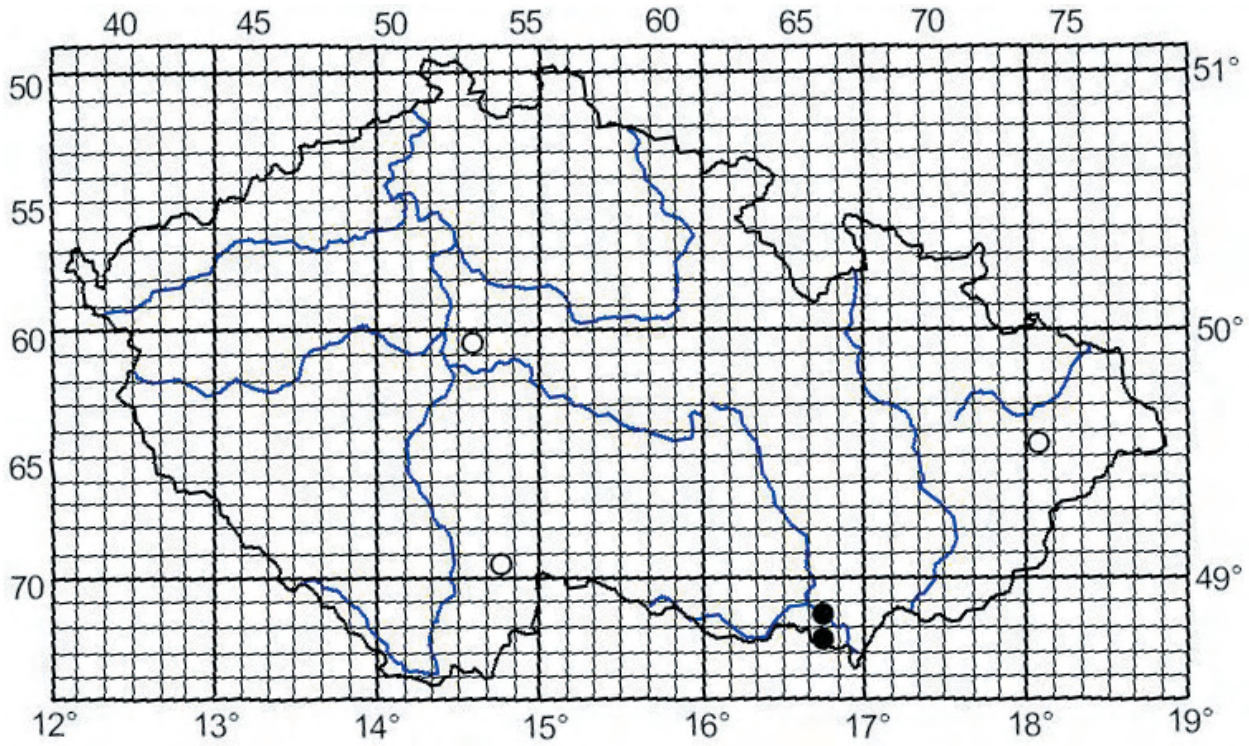

Fig. 3. Distribution of *Bithynia troschelii* in the Czech Republic. Full circle – autochthonous occurrence, empty circle – allochthonous occurrence.

schelii. Data in the list are as follows: site number, geographical co-ordinates (http://www.mapy.cz/), code of the mapping grid for faunistic mapping (according to Pruner & Míka 1996), name of the nearest settlement, description of the site, elevation (m a.s.l.), number of individuals (ex.), date of investigation, name of investigator. References of already published records are given. All samples were identified by L. Beran except the samples from the site no. 2 and 6, which were identified by M. Horsák.
1 – 49°59'52"N, 14°33'34"E, 6053, Průhonice, wetlands in the park in Průhonice (Prague region), 280 m, 150 ex., 2008, P. Jansa, det. L. Beran; **2** – 49°35'19" N, 18°07'29" E, 6474, Štramberk, Dolní Kamenárka (southern quarry under Babí hora Hill, 400 m, **a)** 1 ex., 5 Jun 2003, M. Horsák, **b)** 9 ex., 19 Jun 2005, M. Horsák; **3** – 49°00'20"N, 14°46'22"E, 6954, Třeboň, different tanks in Institute of Botany, Academy of Science of the Czech Republic, 434 m, 60 ex., 11 Jun 2008, L. Beran; **4** – 48°48'35"N, 16°47'56"E, 7166, Lednice, wetlands (temporary pools), 173 m, 6 ex., 26 Apr 2008, L. Beran; **5** – 48°48'33"N, 16°47'58"E, 7166, Lednice, a ditch between Pastvisko National Nature Monument and a road, 173 m, **a)** 94 ex., 29 Aug 1975, O. Ditrich, National Museum Prague, **b)** 100 ex., 9 Nov 1975, O. Ditrich, National Museum Prague. **6** – 48°46'03"N, 16°44'11"E, 7266, Sedlec u Mikulova, southeastern part of the Nesyt Pond National Nature Reserve, 170 m, **a**) 1 ex., 12 Jun 2008, J. Sychra, **b)** 5 ex., 5 Aug 2008, J. Sychra.

Conclusions

Both species are very rare in the Czech Republic and their autochthonous occurrence is restricted to a small area in the lowlands along the Morava River and the Dyje River in southernmost Moravia. *Bithynia troschelii* was also found in three other sites scattered in Bohemia and northern Moravia, but these occurrences are not indigenous. Wetlands, pools, oxbow lakes, and small slowly flowing canals are preferable habitats for both species. In the Red List of the Czech molluscs (Beran et al. 2005) *B. leachii* is classified as Critically Endangered (CR) and this classification is in accordance with obtained results. *B. troschelii* was classified as Regionally Extinct (RE); however, this classification should be changed to Critically Endangered (CR).

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Fig. 4. Tanks with aquatic plants in the Institute of Botany, Academy of Science of the Czech Republic, Třeboň (site with *Bithynia troschelii* no. 3). Photo Eva Koutecká.

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