

## A NEW RECORD OF *BITHYNIA TROSCHELII* (PAASCH, 1842) (GASTROPODA: BITHYNIIDAE) FROM TWO TEMPORARY PONDS IN WARSAW (POLAND)

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**ABSTRACT:** *Bithynia troschelii* (Paasch), a species until recently regarded as a form of *Bithynia leachii* (Sheppard), was found in small artificial ponds in Skaryszewski Park in Warsaw in June 2014. The snail was abundant in two out of the five studied water bodies of the park. The two ponds were the only ones to become dry in winter. Snails of the genus *Bithynia* are able to survive periodic drying of water bodies.

**KEY WORDS:** *Bithynia troschelii*, park, temporary ponds

*Bithynia troschelii* (Paasch, 1842) was treated as a variety or form of *Bithynia leachii* (Sheppard, 1823): as *B. leachi* var. *inflata* Hansen, 1845 (ZHADIN 1952), as *B. leachi* f. *troscheli* Paasch (PIECHOCKI 1979), or as *Bithynia leachi* f. *inflata* (Hansen, 1845) (FALNIOWSKI 1989). According to FALNIOWSKI (1989) many authors regarded *B. troscheli* as a geographical race of *B. leachi*. Also URBAŃSKI (1938, 1947, 1957) treated it as a form of *B. leachi*, though the fact that he later referred to it as *B. leachi troscheli* Paasch (URBAŃSKI 1957) might have suggested subspecies rank. GLÖER & MEIER-BROOK (1998) and GLÖER (2002) regarded it as a subspecies, namely *B. leachii troschelii* (Paasch, 1842). However, in his comprehensive monograph of Prosobranchia, FALNIOWSKI (1989) listed *B. troschelii* as a distinct species. The authors of subsequent studies (FALNIOWSKI et al. 2004, GLÖER et al. 2005), while emphasising the distinctness of *B. leachii* and *B. troschelii*, pointed to their close relationship, similarity and ability, though rare, to produce hybrids. In his chapter on the Bithyniidae, part of the series on the fauna of Poland, PIECHOCKI (2008) mentioned *B. troschelii* as the third, apart from *B. tentaculata* (Linnaeus, 1758) and *B. leachii*, species of the genus *Bithynia*. WELTER-SCHULTES (2012) referred to the snail as *Bithynia transsilvanica* (E. A. Bielz, 1853).

Since *B. troschelii* was largely considered to be a form of *B. leachii*, it was rarely distinguished in studies and, consequently, information on its ecology and occurrence in Poland is very scanty. Apart from old records from the environs of Warsaw (ŚLÓSARSKI 1876, 1877, POLIŃSKI 1917), *B. troschelii* was mentioned from Lake Trłąg (now Lake Pakoskie) in Kujawy and from Wielkopolska, Kujawy and Polesie (URBAŃSKI

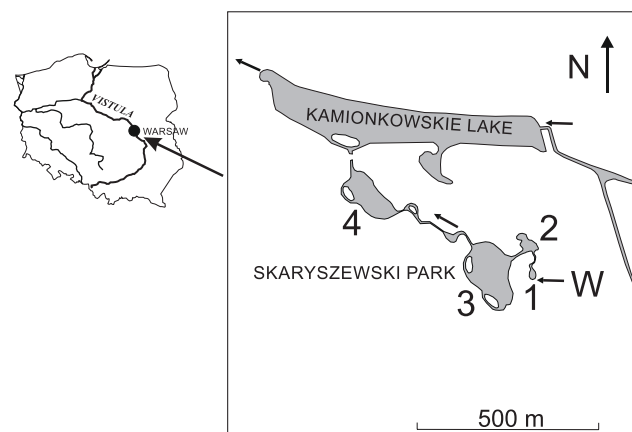


Fig. 1. Water bodies in Skaryszewski Park: 1–4 – ponds; W – waterfall; arrows indicate the water flow direction (drawing E. RYGIELSKA-SZYMAŃSKA)



Figs 2–3. Pond no. 1: 2 – summer, 3 – winter. Photos: K. LEWANDOWSKI

1938, 1947). According to PIECHOCKI (1979), the species is known from a few sites in the Pomeranian Lakeland, Wielkopolsko-Kujawska Lowland and Mazowiecka Lowland. FALNIOWSKI (1989) regards it as a rare species, with few sites in Poland.

In the Czech Republic, *B. troschelii* is very rare (some of its sites are anthropogenic) (HORSÁK *et al.* 2013) and classified as regionally extinct (RE) in the IUCN Red List (BERAN & HORSÁK 2009). Like *B. leachii*, *B. troschelii* appears to be much less frequent than the common *B. tentaculata*; it is associated with small seasonal water bodies and lake phytolittoral (PIECHOCKI 2008).

Water bodies of Skaryszewski Park in Warsaw include Lake Kamionkowskie (an oxbow of the Vistula) and four shallow ponds (Fig. 1) of reinforced shoreline. The ponds appeared during the establishment of the park in the early 20th century in an area situated on the Praga floodplain and covered by wet meadows,

in the environs of the village Skaryszew. To elevate and drain the site, a layer of soil with sand and gravel was spread over the whole area (SZYMKOWIAK & WIERZBICKA 2015). The bottom and shores of pond no. 1 are paved with concrete plates; it is fed with pipeline water which then runs through an artificial waterfall to the next ponds. In winter, the water inflow is cut off and ponds no. 1 ( $52^{\circ}14'30''\text{N}$ ,  $21^{\circ}03'35''\text{E}$ , Figs 2–3) and no. 2 ( $52^{\circ}14'32''\text{N}$ ,  $21^{\circ}03'34''\text{E}$ , Figs 4–5) become completely dry.

Samples of bottom sediments and macrophytes were taken on July 3, 2014 from a depth of 0.3–0.5 m with a bottom scraper, inlet width 20 cm, which was dragged on the bottom along a distance of 1 m (sample area ca.  $1/5 \text{ m}^2$ ). The material was preserved with 4% formalin and then, in the laboratory, washed on a benthic sieve of 1 mm mesh. Basic physical and chemical water parameters were determined with the probe WTW Multi 3430 SET G during sampling.



Figs 4–5. Pond no. 2: 4 – summer, 5 – winter. Photos: K. LEWANDOWSKI



Fig. 6. *Bithynia troschelii* (Paasch, 1842) – three individuals from pond no. 2. Photos: A. OCHOCKA

The water in both ponds had similar pH values (8.20 and 8.25 in pond 1 and 2, respectively), dissolved oxygen concentration (9.28 and 9.32 mg/l), and relatively high electrolytic conductivity (1,328 and 1,312  $\mu\text{S}/\text{cm}$ ). Algae of the genus *Enteromorpha* and various species of submerged and floating-leaved macrophytes: Characeae, *Sagittaria sagittifolia* Linnaeus and *Nuphar lutea* (Linnaeus) Sibth. et Sm., were found in pond no. 2. Fallen leaves of trees and shrubs growing on the shores locally accumulated on the bottom of the ponds.

Macroscopically collected snails were preserved in 70% alcohol and their shells were cleaned with micro-brush. They were identified based on the shell shape, according to PIECHOCKI (1979), FALNIOWSKI (1989) and WELTER-SCHULTES (2012), as well as on the structure of genitalia (penis) according to FALNIOWSKI et al. (2004) and GLÖER et al. (2005).

Sixty one individuals of *B. troschelii* were found in the sample from pond no. 1. After *Radix balthica* (Linnaeus, 1758) it was the second most abundant snail in the pond. In the sample from pond no. 2 *B. troschelii* was the dominant species; 111 individuals were found together with 14 specimens of *B. tentaculata*.

Identification of *B. troschelii* was based on the following conchological features: much convex whorls combined with deep suture, open umbilicus, short junction of the aperture edge with parietal wall (Fig. 6) in contrast to *B. tentaculata* (Fig. 7). The operculum was egg-shaped and posteriorly rounded (Fig. 8) in contrast to the pointed operculum of *B. tentaculata* and the entirely rounded one of *B. leachii* (see descriptions and illustrations in FALNIOWSKI 1989, GLÖER & MEIER-BROOK 1998, GLÖER 2004, GLÖER et al. 2005, WELTER-SCHULTES 2012 and HORSÁK et al. 2013). The shape of penis (Figs 9–10) was similar



Fig. 7. *Bithynia tentaculata* (Linnaeus, 1758) – three individuals from pond no. 2. Photos: A. OCHOCKA

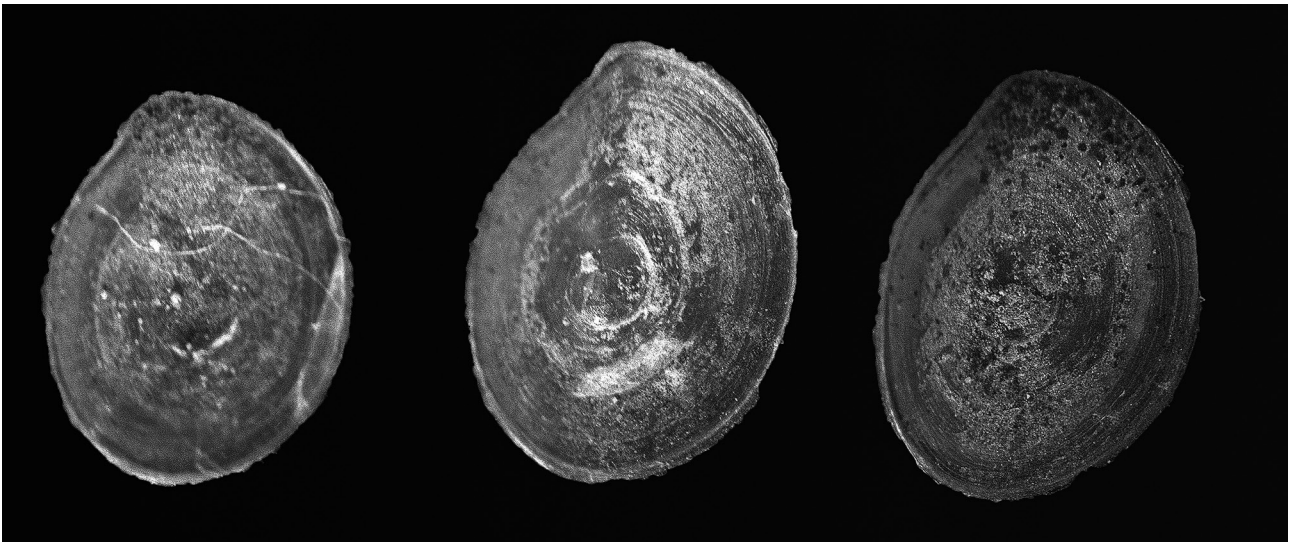


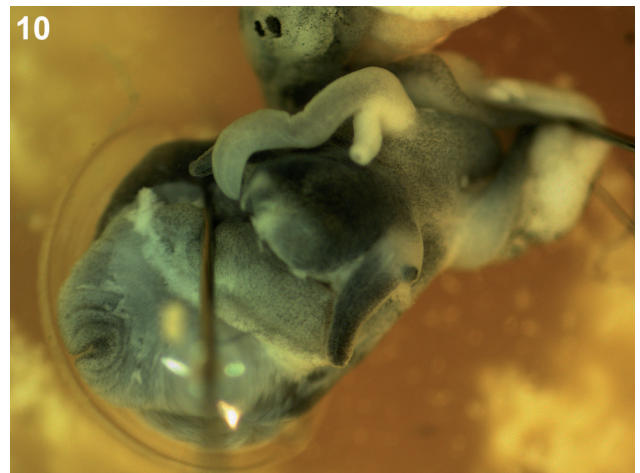
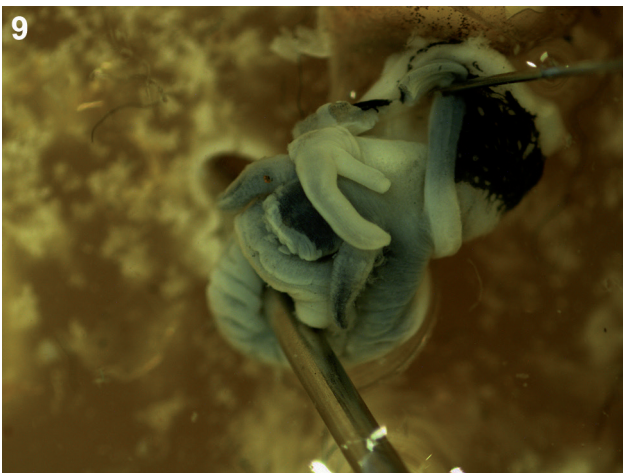
Fig. 8. Three opercula of *Bithynia troschelii* (Paasch, 1842) from pond no. 2. Photos: A. KOŁODZIEJCZYK

to that illustrated in FALNIOWSKI et al. (2004) and GLÖER et al. (2005).

The mean shell height of *B. troschelii* in pond no. 1 was  $6.18 \pm 4.77$  mm ( $n = 60$ ). The values for two clearly separated size classes were: for larger snails ( $n = 44$ )  $7.24 \pm 0.88$  mm, and for smaller snails ( $n = 16$ )  $3.02 \pm 2.02$  mm. The measurements of the two largest individuals from pond no. 1 were (shell height  $\times$  width)  $8.81 \times 6.44$  mm and  $8.30 \times 6.56$  mm, respectively. In pond no. 2, the shell height ( $n = 110$ ) was  $5.72 \pm 4.34$  mm and the two largest individuals were  $9.02 \times 6.94$  mm and  $8.74 \times 6.47$  mm. Forty three individuals from the first pond and 42 from the second pond exceeded the typical maximum shell height of *B. leachii* (4–6 mm as reported by FALNIOWSKI et al. 2004, GLÖER & FEHÉR 2004, GLÖER et al. 2005, GLÖER & SIRBU 2005).

The presence of *B. troschelii* on the right bank of the Vistula near Warsaw was noted already in the 19th century by ŚLÓSARSKI (1877), who in 1873 found several

specimens which he referred to as “*Bythinia Troschelii* Paasch (*Paludina similis* Stein.)” in “a ditch by the flood embankment behind Saska Kępa”. In the whole area of his studies (Polish Kingdom, Lithuania and Polesie), POLIŃSKI (1917) found “*Bythinia leachii* Shepp. var. *troschelii* Paasch” only in the environs of Warsaw, almost exclusively on the right bank of the Vistula River “near the outskirts of Praga”. Hence, based on the new record we reject FALNIOWSKI’s (1989) rather pessimistic opinion on the possible disappearance of *B. troschelii* from most sites near Warsaw. It is noteworthy that after the drainage of the wet meadows the species remained in (or maybe invaded) the two seasonal, artificial water bodies that fall dry in winter, and achieved high densities of about 300 and 500 individuals/m<sup>2</sup>. It is well possible that the snail, which was not included in the identification keys by URBAŃSKI (1957) or PIECHOCKI (1979), was often misidentified by researchers and that its actual range in Poland is much wider than reported in the literature.



Figs 9–10. Two specimens of *Bithynia troschelii* (Paasch, 1842) from pond no. 1 – view of two arms of the penis. Photos: A. KOŁODZIEJCZYK



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## REFERENCES

- BERAN L., HORSÁK M. 2009. Distribution of *Bithynia leachii* (Sheppard, 1823) and *Bithynia troschelii* (Paasch, 1842) (Gastropoda: Bithyniidae) in the Czech Republic. *Malacol. Bohemosl.* 8: 19–23.
- FALNIOWSKI A. 1989. Prządokrzelne (Prosobranchia, Gastropoda, Mollusca) Polski. I. Neritidae, Viviparidae, Valvatidae, Bithynidae, Rissoidae, Aciculidae. *Zesz. Nauk. Uniw. Jagiell.*, *Prace Zool.* 35: 1–148.
- FALNIOWSKI A., GLÖER P., SZAROWSKA M. 2004. *Bithynia troschelii* (Paasch, 1842), a giant of unknown origin? *Folia Malacol.* 12: 137–139. <http://dx.doi.org/10.12657/fol-mal.012.009>
- GLÖER P. 2002. Süßwassergastropoden Nord- and Mitteleuropas. *Die Tierwelt Deutschlands*, 73, Conch Books, Hackenheim.
- GLÖER P. 2004. Zur Identität von *Bithynia troschelii* (Paasch, 1842) (Gastropoda: Bithyniidae). *Malakol. Abh.* 22: 17–22.
- GLÖER P., FALNIOWSKI A., SZAROWSKA M. 2005. *Bithynia leachii* (Sheppard, 1823) and *B. troschelii* (Paasch, 1842), two distinct species? *Heldia* 6: 49–56.
- GLÖER P., FEHÉR Z. 2004. *Bithynia leachii* (Sheppard, 1823) and *Bithynia troschelii* (Paasch, 1842) in Hungary (Prosobranchia: Bithyniidae). *Ann. hist.-nat. Mus. nat. hung.* 96: 285–297.
- GLÖER P., MEIER-BROOK C. 1998. Süßwassermollusken. Deutscher Jugendbund für Naturbeobachtung, Hamburg.
- GLÖER P., SÎRBU I. 2005. New freshwater molluscs species fund in the Romanian fauna. *Heldia* 6: 229–238.
- HORSÁK M., JUŘIČKOVÁ L., PICKA J. 2013. Molluscs of the Czech and Slovak Republics. Nakladatelství Kabourek, Zlín.
- PIECHOCKI A. 1979. Mięczaki (Mollusca). Ślimaki (Gastropoda). *Fauna Ślōdkowodna Polski* 7, PWN, Warszawa-Poznań.
- PIECHOCKI A. 2008. Zagrzebkwate (Bithyniidae). In: BOGDANOWICZ W., CHUDZICKA E., PILIPIUK I., SKIBIŃSKA E. (eds). *Fauna Polski. III. Muzeum i Instytut Zoologii PAN, Warszawa*, p. 381.
- POLIŃSKI W. 1917. Materyały do fauny malakozoologicznej Królestwa Polskiego, Litwy i Polesia. *Prace Towarzystwa Naukowego Warszawskiego. III. Wydział nauk matematycznych i przyrodniczych* 27: 1–130.
- SZYMKOWIAK A., WIERZBICKA K. 2015. 2.3. Warunki geoi hydrologiczne. In: LUNIAK M. (ed.). *Przyroda Parku Skaryszewskiego – raport z realizacji Projektu 2014 r.*, pp. 10–11. [http://www.miastoiptaki.pl/raport\\_ppsk/\(20.06.2015\)](http://www.miastoiptaki.pl/raport_ppsk/(20.06.2015))
- ŚLÓSARSKI A. 1876. Matériaux pour la faune malacologique du royaume de Pologne. *Bull. Soc. Zool. Fr.* 1: 291–299.
- ŚLÓSARSKI A. 1877. Przyczynek do fauny malakologicznej Królestwa Polskiego. Druk K. Kowalskiego ul. Królewska N. 23, Warszawa.
- URBAŃSKI J. 1938. Beiträge zur Kenntnis der Molluskenfauna der Wojewodschaft Poznań. II. *Fragm. Faun. Mus. Zool. Pol.* 3: 339–467.
- URBAŃSKI J. 1947. Krytyczny przegląd mięczaków (Mollusca) Polski. *Ann. Univ. Mariae-Curie-Skłodowska, Sec. C* 2: 1–35.
- URBAŃSKI J. 1957. *Krajowe ślimaki i małże*. PZWS, Warszawa.
- WELTER-SCHULTES F. W. 2012. *European non-marine mollusc, a guide for species identification*. Planet Poster Editions, Göttingen.
- ZHADIN V. I. 1952. *Mollyuski presnykh i solonovatykh vod SSSR*. Izd. AN SSSR, Moskva-Leningrad.

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