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A contribution to the distribution of aquatic molluscs (Mollusca, Gastropoda, Bivalvia) of the Moravian Karst PLA

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BERAN L. & HORSÁK M. 2004: A contribution to the distribution of aquatic molluscs (Mollusca, Gastropoda, Bivalvia) of the Moravian Karst PLA. *Acta Musei Moraviae, Scientiae biologicae* (Brno) **89:** 1–11. – Aquatic molluscs of the Moravian Karst Protected Landscape Area (Southern Moravia, Czech Republic) were studied from 1997 to 2003. Altogether 24 aquatic mollusc species were found in the sites under study. Rich populations of the rare prosobranch snail *Bythinella austriaca* (Frauenfeld, 1859) s.lat. were found.

Key words. Mollusca, aquatic molluscs, distribution, Moravian Karst PLA

Introduction

The first data from the Moravian Karst Protected Landscape Area (PLA) were published by ULIČNÝ (1896) and other data contributed by LOŽEK (1948). All the species mentioned in these publications were also found in the course of our research. More data exist from the Olšovec Pond near Jedovnice, which is situated outside the PLA. NEZVALOVÁ (1970) and BALŮSEK & VOJTEK (1973) studied that site. J. Brabenec and V. Hudec also visited the pond and their unpublished findings are deposited in National Museum in Prague. For more detailed information see Table 1.

Material

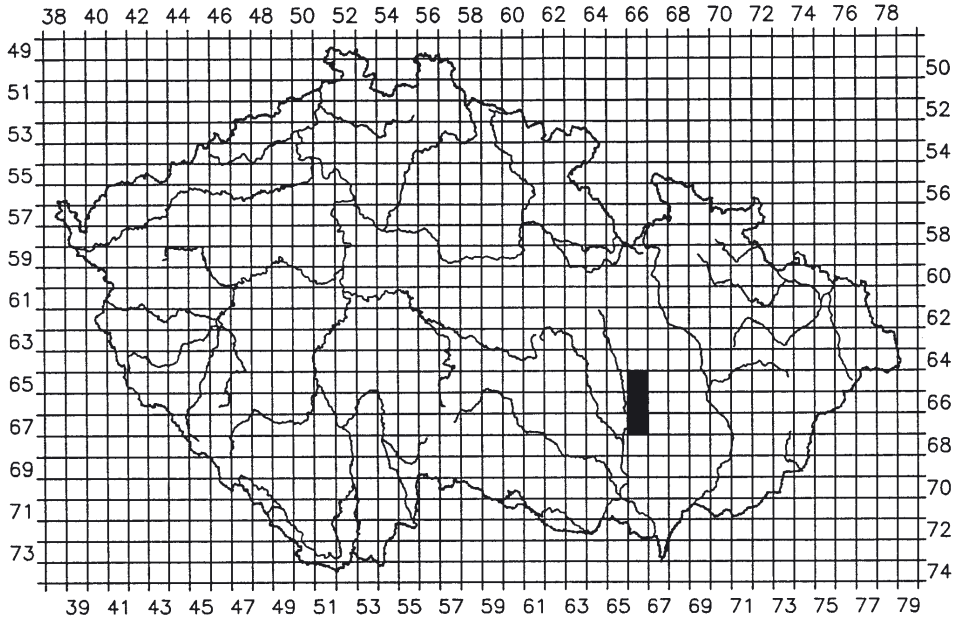
Study area

The Moravian Karst PLA is situated in Southern Moravia and is part of the Dyje River Basin north of the town of Brno (see Map 1 and Map 2). This area is rich to small brooks and springs but other bodies of water (pools, ponds, rivers) occur rarely. Only one river (the Punkva) flows across this area.

Survey of investigated sites

Data in the survey are as organised as follows: number of locality (bold) [1)], code of the mapping field for faunistic mapping after BUCHAR (1982) and PRUNER & MÍKA (1996), name of the nearest village or town, description of the site, date of investigation, name of investigator (see abbreviations).

[1)] Numbers with asterisk (*): Just beyond the border of the Moravian Karst PLA.

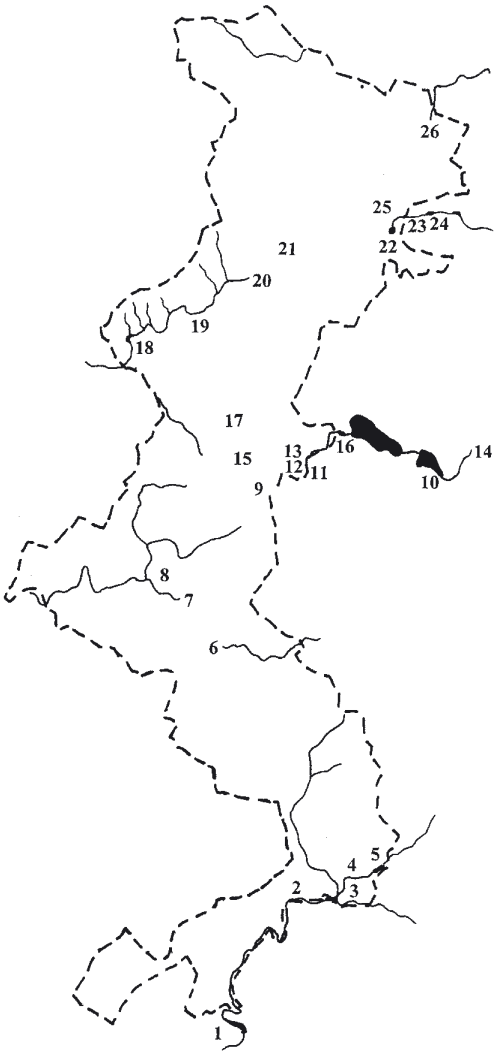


Map 1. Position of the studied area projected onto mapping grid system after BUCHAR (1982) and PRUNER & MÍKA (1996).

Abbreviations of investigators' names

LB . . . . . Luboš Beran
MH . . . . . Michal Horsák
PK . . . . . Petr Kment
YP . . . . . Yvone Pořízková

1* – 49°13'13", 16°42'59", 6766, Brno-Líšeň, a water reservoir on the Říčka Brook, **a)** 23. III. 1997, MH, **b)** 19. VII. 1999, YP, **c)** 12. VI. 2000, MH; **2** – 49°14'35", 16°44'13", 6766, Ochoz u Brna, karst springs of the Říčka Brook below the Lysá hora Rock, 28. X. 1998, MH; **3** – 49°14'46", 16°44'55", 6766, Ochoz u Brna, spring of the Říčka Brook No. 2, 4. VI. 1997, LB; **4** – 49°14'51", 16°44'59", 6766, Ochoz u Brna, spring of the Říčka Brook No. 1, 4. VI. 1997, LB; **5** – 49°15'00", 16°45'43", 6766, Ochoz u Brna, the Hádek Pond and the Hádecký potok Brook, 4. VI. 1997, LB; **6** – 49°17'39", 16°42'45", 6766, Křtiny, spring of the Křtinský potok Brook, 4. VI. 1997, LB; **7** – 49°18'17", 16°41'50", 6666, Josefov, a karst spring under the Býčí skála Rock, **a)** 4. VI. 1997, LB, **b)** 27. X. 1998, MH; **8** – 49°18'28", 16°41'19", 6666, Josefov, a pond in the Josefov Valley, **a)** 16. X. 1997, LB, **b)** 23. IV. 1998, MH; **9** – 49°19'40", 16°43'37", 6666,



Map 2. Moravian Karst Protected Lanscape Area with the position of sampling sites.

Rudice, pools in forest south of Rudice, 16. X. 1997, LB; **10*** – 49°19’45”, 16°46’49”, 6666, Jedovnice, the Dubový Pond – south-eastern part of the Budkovan Pond, 6. X. 1999, PK; **11** – 49°19’45”, 16°44’12”, 6666, Rudice, the Rudické propadání National Natural Heritage Site – the Jedovnický potok Brook 30 m above its sink, 1. V. 1999, PK; **12** – 49°19’50”, 16°44’01”, 6666, Jedovnice, a wetland near the “Pod Tipečkem” Nature Reserve, 16. X. 1997, LB; **13** – 49°19’53”, 16°44’04”, 6666, Jedovnice, the Na Lukách Nature Reserve – a meadow swamp, 25. IX. 1998, PK; **14*** – 49°20’00”, 16°47’21”, 6666, Jedovnice, the Jedovnický potok Brook above the Budkovan Pond, 5. VIII. 1999, PK; **15** – 49°20’08”, 16°43’21”, 6666, Rudice, pools in forest on the western and south-western margin of Rudice, **a)**16. X. 1997, LB, **b)** 5. VIII. 1998, PK, **c)** 1. V. 1999, PK, **d)** 6. VI. 1999, PK, **e)** 5. VIII. 1999, PK; **16*** – 49°20’16”, 16°44’57”, 6666, Jedovnice, the Dymák Pond – a small pond on the southern margin of the village, **a)** 25. IX. 1998, PK, **b)** 6. X. 1999, PK; **17** – 49°20’19”, 16°43’12”, 6666, Rudice, pools on the north-western margin of Rudice, 16. X. 1997, LB; **18** – 49°21’36”, 16°41’26”, 6666, Lažánky, the Jakubovo jezero Pond, 16. X. 1997, LB; **19** – 49°21’48”, 16°42’36”, 6666, Těchov, the Punkva River near Skalní mlýn Mill, **a)** 16. X. 1997, LB, **b)** 20. III. 2002, LB; **20** – 49°22’10”, 16°43’19”, 6666, Vavřinec, the “Malý výtok” outflow downstream of the Punkevní jeskyně Cave, 16. X. 1997, LB; **21** – 49°22’22”, 16°43’41”, 6666, Vilémovice, a lake and a brook at the bottom of Macocha Chasm, 4. VI. 1997, LB; **22** – 49°22’43”, 16°45’59”, 6666, Ostrov u Macochy, a larger pond (used for swimming)

on the south-eastern margin of Ostrov u Macochy, 21. III. 2002, LB; **23** – 49°22'55", 16°46'35", 6666, Ostrov u Macochy, a small pool below the dam of the water reservoir about 500 m to the east of Ostrov u Macochy, 21. III. 2002, LB; **24** – 49°22'55", 16°46'40", 6666, Ostrov u Macochy, a water reservoir about 500 m to the east of Ostrov u Macochy, 21. III. 2002, LB; **25** – 49°23'03", 16°46'03", 6666, Ostrov u Macochy, wetland with drainage ditches on the northern margin of Ostrov u Macochy, **a)** 16. X. 1997, LB, **b)** 20. III. 2002, LB; **26** – 49°24'04", 16°46'41", 6566, Holštejn, the Bílá Voda Brook near the Holštejn – Ostrov u Macochy road, 30. III. 2002, LB.

Methods

Molluscs were collected from stones and other objects (e.g. plastic rubbish) lying in the water. A sifter (a metal bowl-shaped sifter, diameter 20 cm and mesh size from 0.5 to 1 mm) was used for collecting molluscs from vegetation, the open water or the bottom. Specimens for dissection were drowned in carbonated water and later fixed in 70% ethanol.

Results [2)]

This part includes a list of recorded mollusc species, with some descriptive notes: distribution range (see BERAN 2002), distribution in the Czech Republic and in the area under study. Sites with the occurrence of individual species are placed at the end of every individual description.

CLASS GASTROPODA

Order Neotaenioglossa

Family Hydrobiidae

***Bythinella austriaca* (Frauenfeld, 1857) s.lat.** (Fig. 1)

East Alpine-Carpathian taxon. In the Czech Republic this is a rare snail which inhabits springs and small brooks, especially in Moravia because of its more appropriate geological conditions (limestone and other geological strata rich in calcium). In Bohemia this snail lives in the eastern part and occurred near Prague in the past (cf. BERAN 2002). This taxon is considered as "Near Threatened" in the Czech Red List of aquatic molluscs (BERAN 2002). In the Moravian Karst PLA it is a common mollusc, mainly due to the number of suitable habitats. Loc. no. 2–4, 6, 7a,b, 19a, 20, 21.

[2)] The classification used in this communication is identical with that in BERAN (2002).

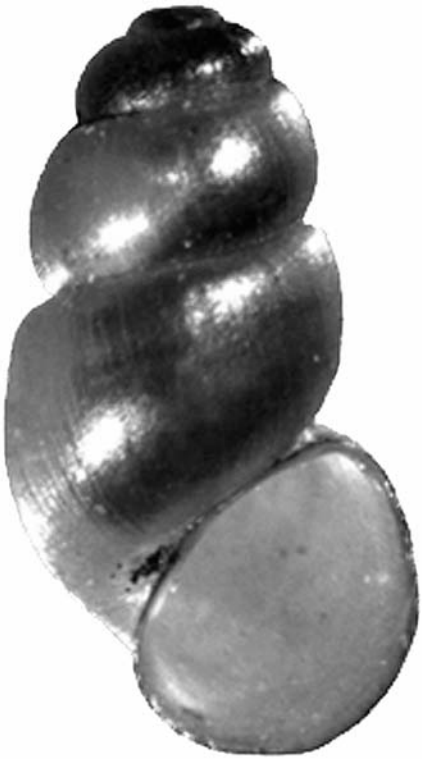


Fig. 1. *Bythinella austriaca* Frauenfeld s.lat.

Family Bithyniidae

***Bithynia tentaculata* (Linnaeus, 1758)**

Palearctic. Common inhabitant of nutrient-rich water bodies, but found in the study area only once – loc. no. 1b.

Order Hygrophila

Family Acroloxidae

***Acroloxus lacustris* (Linnaeus, 1758)**

Palearctic. This common snail occurs in a large part of the Czech Republic. It inhabits still and slow-moving water. In the PLA this species was found only in two sites – loc. no. 9 and 15a.

Family Lymnaeidae

***Galba truncatula* (O. F. Müller, 1774)**

Holarctic. Widespread and common mollusc living in various habitats (e.g. river banks, wetlands, springs). Loc. no. 8a,b, 17, 24 and 25b.

***Radix auricularia* (Linnaeus, 1758)**

Palearctic. Widespread mollusc, occurring in still and slow-moving water. Loc. no. 5, 15a,b, 22 and 24.

***Radix peregra* (O. F. Müller, 1774) s.str.**

Palearctic. This species shows an especial preference for nutrient-poor habitats (e.g. small brooks and springs). This is the reason for its common occurrence in the PLA; it was found in loc. no. 1c, 5, 8b, 9, 13–15a, 16b–18, 19b, 22, 24, 25b.

***Lymnaea stagnalis* (Linnaeus, 1758)**

Holarctic. A widespread and common snail in the Czech Republic. It shows an especial preference for still bodies of water. This species is also widespread in the PLA and was found in loc. no. 5, 8a,b, 14–15b, 16a, 17.

Family Physidae

***Aplexa hypnorum* (Linnaeus, 1758)**

Holarctic. Occurrence of this species is concentrated in the lowlands, where it shows a preference for temporary pools. In the Czech Republic this mollusc is on the decline and is also mentioned as Near Threatened in the Czech Red List of aquatic molluscs (BERAN 2002). In the PLA it was found in one site – loc. no. 5.

***Physella acuta* (Draparnaud, 1805)**

Non-native species introduced to Europe, probably from North America (cf. BERAN 2002). Its occurrence is concentrated mainly in lowlands and in the PLA it was encountered only in loc. no. 1b.

Family Planorbidae

***Anisus leucostoma* (Millet, 1813)**

European-West Siberian. Widespread species, living in temporary pools and wetlands. In the PLA it was recorded in loc. no. 1c, 5 and 13.

***Gyraulus albus* (O. F. Müller, 1774)**

Palearctic. Common and widespread species especially inhabiting "fresh" still and slow-moving water. It is also widely distributed in ponds and water reservoirs in the territory of the PLA. Loc. no. 1c, 5, 8a, 10, 15a–16a, 17, 22, 24–25b.

***Gyraulus crista* (Linnaeus, 1758)**

Holarctic. A common and widespread inhabitant of various still bodies of water. It was recorded in loc. no. 1c, 5, 8a, 9–10, 15a, 17, 22–25b.

***Hippeutis complanatus* (Linnaeus, 1758)**

Palearctic. This small snail is widely distributed throughout the Czech Republic. In the PLA it was found in loc. no. 9, 15a,d,e, 22, 24 and 25b.

***Planorbarius corneus* (Linnaeus, 1758)**

European-West Siberian. This mollusc especially inhabits still and slow-moving water in the lowlands. It was found only in loc. no. 16a and 16b.

***Ancylus fluviatilis* O. F. Müller, 1774**

European. This species lives in springs, brooks and rivers and in the PLA it is widespread and common – loc. no. 2–7a, 19a–21 and 26.

CLASS BIVALVIA

Order Unionoida

Family Unionidae

***Unio pictorum* (Linnaeus, 1758)**

European. In the Czech Republic this is the most common *Unio* species. It inhabits flowing water and larger water reservoirs as well. In the study area it was found in loc. no. 1a.

***Anodonta anatina* (Linnaeus, 1758)**

Euro-Siberian. This is the most common unionid; it inhabits various freshwater habitats. It was recorded in loc. no. 10, 15a and 17.

Order Veneroida

Family Sphaeriidae

***Sphaerium corneum* (Linnaeus, 1758) s.lat.**

Palearctic. This widespread taxon lives in nutrient-rich running water and was found in 3 sites. Loc. no. 9, 15a,d.

***Musculium lacustre* (O. F. Müller, 1774)**

Holarctic. Widespread but probably declining bivalve, inhabiting slow-moving and still water. Loc. no. 1b, 5, 9, 17, 25a.

***Pisidium henslowanum* (Sheppard, 1823)**

Holarctic. Occurrence of this common mollusc is concentrated in the lowlands where it lives especially in slowly-moving water. In the PLA was recorded only in loc. no. 26.

***Pisidium subtruncatum* Malm, 1855**

Holarctic. It is one of the most widespread species of the genus *Pisidium* in the Czech Republic; found in loc. no. 1b, 7b, 11, 16b, 24 and 26.

***Pisidium obtusale* (Lamarck, 1818)**

Holarctic. This pill-clam inhabits small bodies of water and it is widespread in the Czech Republic (excluding SE Moravia, where it is rare). Loc. no. 25a,b.



Fig. 2. *Pisidium personatum* Malm.

***Pisidium personatum* Malm, 1855** (Fig. 2)

Euro-Siberian. This species prefers spring habitats and in the PLA was found in loc. no. 2, 4, 7b, 21 and 25b.

***Pisidium casertanum* (Poli, 1791)**

Probably Cosmopolitan. This is the most widespread species of the genus *Pisidium* of all. It is also the most common pill-clam in the PLA: loc. no. 1c, 2, 5, 7a, 7b, 9, 11, 12, 17–19a, 20, 25a and 26.

Species	Locality Nr.												
	1a	1b	2a	2b	2c	2d	3	4a	4b	5	6a	6b	7
Bythinella austriaca s.lat.	x	x						x	x			x	x
Galba truncatula				x							x		
Radix auricularia				x	x								
Radix peregra s.str.				x			x			x			
Radix ovata						x							
Lymnaea stagnalis				x	x	x							
Physa fontinalis				x		x							
Planorbis planorbis			x										
Gyraulus albus				x									
Gyraulus crista				x									
Planorbarius corneus				x		x							
Ancylus fluviatilis							x						
Sphaerium corneum s.lat.				x									
Musculium lacustre				x									

Tab. 1. A list of historical records of aquatic molluscs in the Moravian Karst Protected Landscape Area. 1 – Adamov, 6666, Josefov Valley south-east of Adamov, a) Uličný (1896), b) Ložek (1948); 2 – Jedovnice, 6666, Olšovec Pond, a) 1.1.-31.12.1949, lgt. J. Hudec, coll. National Museum Prague, b) 22.8.1963, lgt. J. Brabenec, coll. National Museum Prague, c) Nezvalová (1970), d) Balůsek & Vojtek (1973); 3 - Křtiny, the Křtinský potok Brook near Josefov, Uličný (1896); 4 – Ochoz u Brna, 6766, spring of the Říčka Brook, a) Uličný (1896), b) Ložek (1948); 5 – Ochoz u Brna, 6766, valley between Březina and Ochoz u Brna, Ložek (1948); 6 – Ochoz u Brna, 6766, valley of Říčka Brook, a) Ložek (1948), b) 21.6.1965, lgt. J. Brabenec, coll. National Museum Prague; 7 – Vilémovice, 6666, outflow of the Punkva River, Ložek (1948).

Discussion

In the course of research on the freshwater molluscs of the Moravian Karst Protected Landscape Area, 30 sites were studied. This investigation yielded us data on the occurrence of 24 species (15 gastropods, 9 bivalves) in different aquatic habitats (lakes, rivers, brooks, springs, ponds, pools and others). The malacofauna of the Punkva River, brooks and springs is not rich and *Bythinella austriaca* s.lat., *Ancylus fluviatilis* and *Pisidium casertanum* are characteristic of these localities. Of prime importance is the occurrence and especially rich population densities of *Bythinella austriaca* s.lat. in some sites, because this snail is considered as a vulnerable or endangered species in most of European countries. However, it is important to note that the taxonomics of this snail are not particularly well-known to date (cf. Falniowski 1987, Glöer 2002). This snail is considered "Near Threatened" in the Czech Red List of aquatic molluscs (Beran 2002) particularly because of its more common occurrence in Moravia. Excluded the Moravian population, it would be perhaps considered "Highly Threatened", i.e. in imminent danger of extinction.

Most of the localities with still water (pools, ponds) are artificial and their malacofauna is made up of common species. The most interesting is a complex of pools

	Locality number																																				
Species	1a	1b	1c	2	3	4	5	6	7a	7b	8a	8b	9	10	11	12	13	14	15a	15b	15c	15d	15e	16a	16b	17	18	19a	19b	20	21	22	23	24	25a	25b	26
Bythinella austriaca s.lat.				20	20	40		5	100	18																		5		20	200						
Bithynia tentaculata		6																																			
Acroloxus lacustris													10						20																		
Galba truncatula											5	3														20								3		18	2
Radix auricularia							10												10	1												12		4			
Radix peregra s.str.			10				40					22	10				10	1	10						1	20	300		1			3		12		800	
Lymnaea stagnalis							40				10	2						1	20	16				1		20											
Aplexa hypnorum							20																														
Physella cf. *acuta*		3																																			
Anisus leucostoma			7				20										1																				
Gyraulus albus			17				10				10			6					10	6	6	2	1	1		20						15		10	5	25	
Gyraulus crista			7				10				10		10	1					20							20						45	7	35	20	5	
Hippeutis complanatus													10						40			1	3									13		15		7	
Planorbarius corneus																								1	1												
Ancylus fluviatilis				60	10	20	10	5	40	4																		10	35	20	20						9
Unio pictorum	20																																				
Anodonta anatina														1					10							5											
Sphaerium corneum s.lat.													10						10			5															
Musculium lacustre		5					50						10													20									40		
Pisidium henslowanum																																					3
Pisidium subtruncatum		1								3					1										3									6			4
Pisidium obtusale																																			5	3	
Pisidium personatum				6		20				7																					20					10	
Pisidium casertanum			3	2			20		20	2			20		7	50										10	20	5		10					10		1
Total no. of spp. in site	1	4	5	4	2	3	10	2	3	5	4	3	7	3	2	1	2	2	9	3	1	3	2	3	3	8	2	3	2	3	3	5	1	7	5	7	5

Tab. 2. A list of aquatic mollusc species recorded in the Moravian Karst Protected Landscape Area, arranged according to site number.

near Rudice. These pools are isolated and their origin is associated with commercial exploitation 30–100 years ago. Nevertheless, their mollusc communities were species-rich and included some that are rare within the Moravian Karst (e.g. *Acroloxus lacustris*).

When we compare the mollusc fauna of Moravian Karst with other European Karsts, especially those located south of the Moravian formations (including the nearby Slovakian Karst), we note an absence of crenobiotic mollusc species. The reasons for this may be associated with their geographical position and the process of development during the Quaternary. Also important is the fact that the underground waters of the Moravian Karst are allochthonous and are colonized only by common species of the surface water habitats with an affinity for underground waters (e.g. *Ancylus fluviatilis* and *Pisidium personatum*).

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