

Unintentional introduction of aquatic molluscs from Poland to Prague (Czech Republic)

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The aquatic mollusc populations of a restored water reservoir N1 – Stodůlky (Prague Capital City, Czech Republic, Elbe River Basin) were studied during 2005. Two visits, one and two months after inundation of the reservoir revealed rapid colonisation by 14 species of aquatic molluscs and the introduction of eight species (*Valvata macrostoma*, *Stagnicola palustris* s. str., *S. corvus*, *Planorbis planorbis*, *Bathymphalus contortus*, *Anisus spirorbis*, *A. septemgyratus*, *Segmentina nitida*) from a site in north-western part of Poland (Tuchola region, Wisla River Basin about 450 km distant). These molluscs were transported on coir rollers and matting which were used for stabilisation of the reservoir banks during restoration.

Introduction

Introductions and expansions of alien or non-native aquatic molluscs in the territory of Europe have been studied in numerous cases and the Czech Republic is not an exception in this respect (e.g. BERAN 1994, 1997a, 1997b, 2000, 2002, 2003, BERAN & HORSÁK 2002b). However, the situation is different in the case of introductions and transfers of autochthonous species among different regions, countries, river basins or marine drainage areas. The main reason for this difference is the limited possibilities for recording the introduction of autochthonous species and the need to be familiar with their source area. The case described below is a good example of the introduction of several species of aquatic molluscs from the north-eastern part of Poland to Prague (Czech Republic) and of their rapid colonisation of a restored water reservoir.

Material and Methods

During 2005 the author studied aquatic molluscs in selected water reservoirs and ponds in the territory of Prague. A water reservoir N1 – Stodůlky (geographical coordinates – 50°02'51" N, 14°19'42" E, code for faunistic grid mapping 5951 (cf. PRUNER & MÍKA 1996), altitude 317.6 m a.s.l.) was one of

the sites studied and was visited on June 19th and on July 10th. This water reservoir has an area of 1.7 hectares and a maximum depth of approximately 3 metres. It was built about 30 year ago on the Prokopský potok brook. In autumn 2004 it was drained and during the winter of 2004/2005 was rebuilt. Reconstruction comprised removal of sediment from the deeper sections and stabilisation of the reservoir banks with coir rollers of 30 cm diameter (scrolled matting) and flat matting. The water reservoir was re-filled with water less than one month before the author's first visit. Information given in this paper concerning the reconstruction techniques and the coir rollers and matting (cultivation of vegetation, transport) were obtained from a signboard situated on the bank of the reservoir, from personal communication with J. Karnecki (Authority of the Prague Capital City), and from the electronic presentations of Hydrolech Ltd.

The most common sampling method for aquatic molluscs is the washing of vegetation or sediments and collection with a metal sieve (a kitchen strainer, diameter 20 cm, mesh size 0.5–1 mm). This method (washing vegetation on selected sites along the bank of the water reservoir) could be used during the second visit when the coir rollers

covered with vegetation were below the water level (5–25 cm). However, during the first visit, molluscs were found only on plastic bags and stones on the bottom of the reservoir close to the pond banks. At this time the rollers were above the water level and only one month after filling up stones and plastic bags represented the only environment for molluscs (sediment or vegetation having not yet occurred at the site). Nearly all plastic bags present and a selection of stones were observed during the first visit. The duration of searching was the same (approximately 1 hour) during both visits. Molluscs were mainly determined by their conchs. Only specimens of the genus *Stagnicola* were dissected after killing with hot water and identified on the base of their copulatory organs. The classification used is that of BERAN (2002). Conchs of *Valvata macrostoma*, *Stagnicola palustris* s. str., *Anisus spirorbis*, *A. septemgyratus* are deposited in the author's collection.



Fig. 1. Map of Europe with target and source areas of introduction.

Results and discussion

During the two visits the presence occurrence of 14 species of aquatic molluscs was documented (Table 1). Their occurrence only one or two months after filling up of the reservoir is very surprising. Such a rapid colonisation by aquatic molluscs and the dramatic expansion during the period between the two visits is unusual. However, in the case of *Galba truncatula*, *Radix auricularia*, *Lymnaea stagnalis*, *Physella acuta*, *Gyraulus albus* and *G. crista* it is explicable. Molluscs of these species could colonise this site from Prokopský potok brook which flows through the water reservoir or may have been introduced by birds, e. g., the wild

duck (*Anas platyrhynchos*). All six species are relatively common in adjacent water bodies (brooks, ponds, water reservoirs) in this region and they belong to species which inhabit new or restored water bodies very soon after inundation. Also it is not ruled out that these snails could have lived in the reservoir earlier (samples were not collected before the reservoir was emptied and cleaned) and survived in moist areas and in the sediment during the reconstruction.

More surprising was the occurrence of the other eight species (*Valvata macrostoma*, *Stagnicola palustris* s. str., *S. corvus*, *Planorbis planorbis*, *Bathyomphalus contortus*, *Anisus spirorbis*, *A. septemgyratus*, *Segmentina nitida*). The last three species were dominant during the second visit. All these molluscs usually inhabit overgrown water bodies in later seral stages, temporary pools or wetlands (cf. BERAN 2002). According to JURIČKOVÁ (1995) and BERAN (2002) *Stagnicola corvus*, *Planorbis planorbis* and *Bathyomphalus contortus* very rarely occur in Prague, while the other five species have never been found in this region. *Valvata macrostoma* is a very rare mollusc for the Czech Republic. It usually settles in temporary pools and wetlands in lowlands and recently has been found at 2 sites in Elbe River Lowland near Mělník (BERAN 2002). *Anisus septemgyratus* is known in the Czech Republic only in Southern Moravia (Dyje River Basin) where it is found in pools and wetlands in floodplain forests (BERAN & HORSÁK 2002a). On the basis of this evidence, the occurrence of these species is considered surprising and natural introduction (e. g., by birds) of all eight species is thought to be very improbable. The only reasonable explanation for their occurrence is their introduction via the coir rollers and matting used for the restoration. The coir rollers and matting which were used for the stabilisation of the reservoir banks had been placed in water tanks for two years before their use and wetland plants (e. g., *Carex* spp., *Iris pseudacorus*, *Acorus calamus*) had been cultivated on them. This cultivation occurred in the north-west of Poland near the town of Tuchola (Wisla River Basin, about 450 km distant from Prague) in the facility of Hydrolech Ltd. The rollers and matting with wetland vegetation were then transported from Poland to Prague to the Stodůlky water reservoir. Strong evidence for the presence of molluscs in the water tanks in Poland was provided by the many empty shells of *Stagnicola* spp., *Planorbis planorbis*, *Anisus spirorbis*, *A. septemgyratus*, *Bathyomphalus contortus*, *Segmentina nitida* and *Planorbarius corneus* which were found on rollers and matting during the first visit (June). Thus, there is strong evidence that some individuals of all species except for *Planorbarius corneus* had survived the transport and sub-

sequently colonised the water reservoir in Stodůlky despite the fact that this habitat is generally not suitable for species occurring in shallow and overgrown stagnant aquatic habitats.

These observations show how human activities can directly cause dispersion of living organisms including aquatic molluscs. The continuing survival and maintenance of the eight introduced species in this new habitat will depend on a range of environmental factors including habitat stability, vegetation, fish stock, and physico-chemical water characteristics. However, in the case of several species it is possible that they will persist, and therefore it will be interesting to observe further development of their populations.

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Table 1. List of species found in water reservoir Stodůlky

SPECIES (Family)	NUMBER OF INDIVIDUALS	
	19th June 2005	10th July 2005
Valvatidae		
<i>Valvata macrostoma</i> Mörch, 1864		1
Lymnaeidae		
<i>Galba truncatula</i> (O. F. Müller, 1774)	3	
<i>Stagnicola palustris</i> (O. F. Müller, 1774) s. str.		5
<i>Stagnicola corvus</i> (Gmelin, 1791)	2	1
<i>Radix auricularia</i> (Linnaeus, 1758)	25	ca 40
<i>Lymnaea stagnalis</i> (Linnaeus, 1758)	4	50-100
Physidae		
<i>Physella acuta</i> (Draparnaud, 1805)	30	50-100
Planorbidae		
<i>Planorbis planorbis</i> (Linnaeus, 1758)	13	ca 35
<i>Anisus spirorbis</i> (Linnaeus, 1758)	4	50-100
<i>Anisus septemgyratus</i> (Rossmassler, 1835)		50-100
<i>Bathyomphalus contortus</i> (Linnaeus, 1758)		4
<i>Gyraulus albus</i> (O. F. Müller, 1774)	3	50-100
<i>Gyraulus crista</i> (Linnaeus, 1758)	7	5
<i>Segmentina nitida</i> (O. F. Müller, 1774)	4	30



Fig. 2. The restored water reservoir N1 – Stodůlky, Prague, Czech Republic. Photo L. BERAN.



Fig. 3. Bank of the restored water reservoir stabilised with coir rollers with cultivated vegetation. Photo L. BERAN.