

Short communication

Expansion of *Sinanodonta woodiana* (Lea, 1834) (Bivalvia: Unionidae) in the Czech Republic

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Abstract

In this paper we have compiled all information on Chinese pond mussel *Sinanodonta woodiana* (Lea, 1834) in the Czech Republic. This species was found in the Czech Republic for the first time in 1996 and altogether 20 records about its occurrence had been obtained till the beginning of 2008. The species was found in rivers, oxbow lakes and ponds. The expansion is the most intensive in Southern and Central Moravia, which is likely due to the fact that it is the warmest part of the country.

Key words: *Sinanodonta woodiana*, Bivalvia, alien species, distribution, Czech Republic

The Chinese pond mussel [*Sinanodonta woodiana* (Lea, 1834)] (Figure 1) is a large size representative of Unionidae family and is native to East and South-East Asia (Zhadin 1952). This mussel was recorded in Europe for the first time in Romania in 1979 (Sárkány-Kiss 1986) and was introduced to Europe probably along with Chinese fish such as silver carp (*Hypophthalmichthys molitrix* Valenciennes, 1844), bighead carp (*Aristichthys nobilis* Richardson, 1844) and grass carp (*Ctenopharyngodon idella* Valenciennes, 1844). Recently this mussel has become widely distributed across over Europe (Austria see Reischutz 1998, Hungary see Péto 1984, Slovakia see Košel 1995, Poland see Bohme 1998, Kraszewski and Zdanowski 2007, Germany see Glöer and Zettler 2005) with the greatest spread and occurrence reported from several countries such as Slovakia (Halgoš 1999) or Italy (Cianfanelli et al. 2007). Recently this species is used for pearl production (Berni et al. 2004) and this exploitation can accelerate expansion of this mussel. The aim of this paper is to present the current distribution of Chinese

pond mussel in the Czech Republic and to determine the potential impacts on local, native unionid fauna.

Part of the data were obtained by author's field research during last 10 years. The minor part comes from published papers. The remaining part about distribution of the Chinese pond mussel were obtained from different explorers (pers. comm., author always determined or revised material) due to call appeal for monitoring of this mollusc in popular scientific or protectionist journals (Beran 2003, 2004, 2006).

In the Czech Republic the Chinese pond mussel was first recorded in 1996 in an oxbow of the Dyje River near Břeclav (Southern Moravia, Dyje River basin) (Beran 1997). Five years later (2001) this mussel was recorded in the Žehuňský rybník Pond in Central Bohemia (Beran 2002). This record was the first for Bohemia (western part of the Czech Republic, Elbe River basin). In Bohemia the Chinese Pond mussel was found for the second time in 2006 in emptied pond Vilímek near Humpolec town (record No. 3 in Annex 1).



Figure 1. *Sinanodonta woodiana*. Photo J. Novák

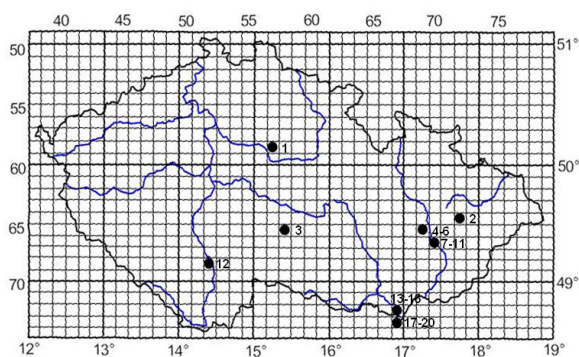


Figure 2. Distribution of *Sinanodonta woodiana* in the Czech Republic.



Figure 3. Emptied Hradecký rybník Pond (record No. 4). Photo J. Novák.

In 2007 this mussel was found in Hněvkovice dam reservoir and this record is the first find in the dam reservoir on the territory of the Czech Republic. In Moravia records of this non-native species increase rapidly and recently are accumulate especially in Southern Moravia (Dyje and Morava River basins) and Central Moravia (Morava River basin) (Novák 2004, Beran 2007). Sixteen records of this species exist from this area from 2003 till 2008 (Annex 1, Figure 2). Abundant occurrence of this mussel was recorded in several cases (see Annex 1). The expansion in one of studied sites – the Kyjovka River (records No. 13 and 18) is also evident from the comparison with records obtained by author ca 10 years ago. Molluscan communities of both sites were studied in 1997 respectively 1996 and *S. woodiana* was not found there.

In the Czech Republic *Sinanodonta woodiana* inhabits mainly ponds (records No. 1-3, 4, 6 in Annex 1, Figure 3), oxbows (No. 14, 15, 20), slowly flowing rivers, and canals in floodplains (No. 5, 7-11, 13, 16-19) where is most commonly found in muddy sediment. Only one record exists from the dam water reservoir (No. 12). Chinese Pond mussel was documented in altitude ranges between 158 –205 m with three exception when was recorded in altitude 250 m (record No. 2 in Annex 1), 367 m (record No. 12) and 529 m (record No. 3).

In 10 sites studied by author the Chinese Pond mussel co-occurred with none to 6 other unionids (Table 1). Common unionids as *Unio pictorum* (Linnaeus, 1758), *Anodonta anatina* (Linnaeus, 1758) and also *Unio tumidus* Philipsson, 1788 co-occurred with this mussel most often while *Unio crassus* Philipsson, 1788 and *Pseudanodonta complanata* (Rossmäessler, 1835) which are rare and occur in different habitats was found together with *S. woodiana* only once. In some sites in Central and Southern Moravia (No. 4, 13, 15, 16) *S. woodiana* belongs to dominant molluscs and competition with indigenous unionids is very probable. This competition is possible not only among adult mussels (i.e place, feed) but because of the same host fish (e. g. *Tinca tinca* Linnaeus, 1758) also among larval stage. Competition with indigenous unionids is mentioned e. g. in Italy by Cianfanelli et al. (2007) while Kraszewski and Zdanowski (2007) excluded possibility of competition in the lake system near Konin (central Poland) that is heated by power plant discharge waters and in this case the main reason (according to authors) is occurrence in different sites when *S. woodiana*

Table 1. Abundance of unionids on the selected sites (number of collected specimens).

Species	Locality No.										Σ
	1	2	7	10	11	13	14	16	17	18	
<i>Unio crassus</i>								1			1
<i>Unio tumidus</i>			25	9	11		20		12	3	6
<i>Unio pictorum</i>	110		20	14	14		40	3	15	1	8
<i>Anodonta cygnea</i>	16		2				20				3
<i>Anodonta anatina</i>	10		50	7	8	5	20		13	12	8
<i>Pseudanodonta complanata</i>			1				3				1
<i>Sinanodonta woodiana</i>	1	6	7	1	4	25	3	25	1	6	10

prefers higher temperature than indigenous unionids.

The Chinese pond mussel belongs to one of eight non-native molluscs – *Potamopyrgus antipodarum* (Gray, 1843), *Physella acuta* (Draparnaud, 1805), *Gyraulus parvus* (Say, 1817), *Menetus dilatatus* (Gould, 1841), *Ferrissia fragilis* (Tryon, 1863), *Corbicula fluminea* (O. F. Müller, 1774), *Dreissena polymorpha* (Pallas, 1771) which have been recorded in the Czech Republic. In Bohemia in the Elbe River basin Chinese pond mussel occurs still very occasionally but in Moravia in the Morava River basin in the warmest parts of the Czech Republic in Central and Southern Moravia this species occurs more frequently and stable, dense and fast spreading populations exist there. Due to this fact, the Chinese pond mussel can present danger for native unionids because of possible competition especially in Central and Southern Moravia.

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Annex 1. Records of *Sinanodonta woodiana* in the Czech Republic in 1996-2007.

Record No.	Record coordinates		Mapping field	Altitude	Record date	Number of collected specimens	Collector
	Latitude, °N	Longitude, °E					
1	50°08'41"	15°19'13"	5857	204	21.10.2001	1	L. Beran ¹
2	49°33'38"	17°44'19"	6472	250	21.10.2007	6	L. Beran
3	49°29'01"	15°22'37"	6558	529	5.12.2006	10	J. Pokorný, A. Havlíčková
4	49°26'46"	17°14'22"	6569	201	26.1.2008	37	J. Novák
5	49°26'23"	17°17'38"	6569	201	12.9.2007	1	J. Šafář
6	49°26'21"	17°17'42"	6569	201	1.-30.3.2003	10	J. Marx
7	49°21'15"	17°21'27"	6670	195	14.7.2007	7	L. Beran ²
8	49°20'59"	17°22'17"	6670	195	22.6.2003	3	J. Novák ³
9	49°20'41"	17°22'22"	6670	195	6.12.2003	16	J. Novák ³
10	49°20'39"	17°22'25"	6670	191	14.7.2007	1	L. Beran ²
11	49°20'01"	17°23'31"	6670	191	14.7.2007	4	L. Beran ²
12	49°10'33"	14°27'18"	6852	367	3.9.2007	4	J. Peterka
13	48°44'40"	16°59'10"	7267	156	22.9.2007	25	L. Beran
14	48°43'30"	16°53'25"	7267	158	21.9.1996	3	L. Beran ⁴
15	48°43'30"	16°53'25"	7267	158	10.4.2006	500	I. Pavlov
16	48°43'29"	16°53'20"	7267	158	4.11.2007	25	L. Beran
17	48°42'43"	16°54'10"	7367	158	4.11.2007	1	L. Beran
18	48°43'03"	16°58'12"	7367	158	31.12.2007	6	L. Beran
19	48°39'12"	16°56'28"	7367	158	23.4.2004	1	
20	48°39'12"	16°56'28"	7367	158	27.2.2007	1	J. Chytil

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³Beran L (2007) Vodní měkkýši Malé Bečvy (Česká republika). [Aquatic molluscs of the Malá Bečva River (Czech Republic)]. Malacologica Bohemoslovaca, 6: 29-34. Online serial at <<http://mollusca.sav.sk>> 7-September-2007

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