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First record of the invasive polychaete *Hypania invalida* (Grube, 1960) in the Czech Republic

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Abstract

Hypania invalida is a freshwater polychaete of Ponto-Caspian origin that has recently colonised many large European rivers. Here we report the first record of this species in the territory of the Czech Republic. It was found at four sites in the Elbe River close to the Czech-German border in 2014. We presume that the most probable vector was the shipping industry.

Key words: Labe, Elbe, Ponto-Caspian, non-indigenous species, aquatic, neozoa

Introduction

Large rivers are very sensitive to the invasion by non-indigenous aquatic species. They can serve as natural pathways stretching over large distances. Most large rivers are anthropogenically disturbed and often exploited as navigation channels. For these reasons, large rivers are under special threat, which is reflected by large numbers of non-indigenous species (e.g. Leprieur et al. 2008; Leuven et al. 2009). Currently, there is only one Czech river (the Elbe) that is used as a navigation channel connected to large European navigation routes. A couple of non-native aquatic invertebrate species have recently invaded the Elbe River in the Czech Republic: *Corbicula fluminea* (O. F. Müller, 1774), *Dikerogammarus villosus* (Sowinsky, 1894), *Hemimysis anomala* (Sars, 1907), *Atyaephyra desmarestii* (Millet, 1831), and *Jaera istrii* Veuille, 1979 (Beran 2000; Špaček et al. 2003; Horecký et al. 2005; Straka and Špaček 2009).

Hypania invalida (Grube, 1960) is one of the few polychaetes occurring in fresh waters (Glasby and Timm 2008). From its original distribution in the Ponto-Caspian region, it started to spread through European inland waters in the 1950s and 1960s (e.g. Woźniczka et al. 2011; Zorić et al. 2011; Vanden Bossche et al. 2001). Its invasion of the Elbe River occurred through the Southern corridor (Bij de Vaate et al. 2002). First, it invaded the Danube River, then the Main-Danube Canal, subsequently the Rhine River, and through the Mittelland Canal it invaded the Elbe River (Tittizer et al. 2000). It was first found in the Elbe River in 2007 near Wittenberg, Germany (Eggers and Anlauf 2008) c. 440 km away from the German-Czech border. Here we report the first record of this species in the Czech stretch of the Elbe River.

Methods

Benthic invertebrate samples were collected by a multi-habitat kick sampling method using a standardised net comprising of a square frame (25 × 25 cm) and a mesh with a pore size of 500 µm. A few sites close to the Czech-German border were sampled to evaluate the impact of ship navigation and for routine environmental monitoring.

Table 1. Records of *Hypania invalida* in the Czech stretch of the Elbe River.

Site No.	Location	Habitat	Number of specimens	Record coordinates		Record date
				Latitude	Longitude	
1	Děčín	natural bank	2	50°50′10″N	14°13′34″E	19 November 2014
2	Děčín	river groyne	9	50°49′40″N	14°13′36″E	19 November 2014
3	Děčín	river groyne	2	50°49′27″N	14°13′29″E	19 November 2014
3	Děčín	river groyne	1	50°49′27″N	14°13′29″E	19 June 2014
4	Lovosice	port	76	50°31′01″N	14°03′28″E	21 June 2014

Figure 1. Elbe River at site 3, on 19th June 2014. Man-made river groyne near Děčín. Photograph by M. Straka.

Figure 2. Four specimens of *Hypania invalida* collected at site 2. Photograph by M. Straka.

Samples were taken in spring, autumn and summer. Samples were preserved in 4% formaldehyde and all invertebrates were sorted out and identified in the laboratory.

Hypania invalida was identified at four sites (Table 1). Site 1 is located on the left bank of the Elbe River (Labe in Czech) close to the Czech-German border. The river bank at this site is anthropogenically unmodified and natural with pebbles and cobbles dominating the substrates. Sites 2 and 3 are artificial river groynes made for shipping purposes (Figure 1). The dominant substrate is pebbles and cobbles, with some quarry stones. Site 4 is a port for recreational craft and has a ferry located 1 km downstream of a weir with a lock chamber. The river banks are composed of quarry stones and paving adjustments. Gravel and stones with muddy sediment dominate the bottom substrate here. River width varies between 100 and 150 m at all sites.

Results and discussion

Hypania invalida was found for the first time in the territory of the Czech Republic in a sample from the 19th of June 2014 at site 3 near Děčín (Figure 1). On the 21st of June 2014, 76 specimens were recorded in one sample at site 4 at the Lovosice city port near the ferry. This site is 50 km distant from the previous one, suggesting that the species is widely distributed in the river, and that it is likely that the species also occurs at other localities in the Czech stretch of the Elbe River. Establishment of the species was confirmed in autumn 2014 at two other sites near Děčín (Table 1). However, observed abundances were relatively low and contributed to approximately 1% of the entire macroinvertebrate assemblage at the Děčín sites and to 20% at the Lovosice site.

Hypania invalida is gonochoric with an exclusively sexual mode of reproduction. The males

discharge their sperm into the water column and fertilise eggs within the female dwelling tubes. Later, small juveniles disperse in the water and can be easily transported through the ballast water of ships (Norf et al. 2010). Downstream dispersal of this polychaete is enhanced by simple drifting, especially during floods (Woźniczka et al. 2011). Since the ship dock is located approximately 4 km upstream of collection sites 1–3 and site 4 is within a port, we conclude that the most probable vector of colonisation of the Czech Elbe River was the shipping industry, followed by downstream drift dispersion.

The species is very characteristic, with a conically elongated segmented body (Figure 2). On the sides there are two rows of tufts of long bristles and near the mouth there are conspicuous tentacles. These are partly retracted in fixed material but are still readily visible. The species can therefore be easily identified and so far cannot be mistaken with other species already occurring in the Elbe River.

The preferred habitat is a muddy bottom with reduced flow velocity (Woźniczka et al. 2011); however, Šporka (1998) found this species to be dominant in a gravel bottom of the main river channel. It is interesting that *Hypania invalida* has a strong preference for the druses of the mollusc *Dreissena polymorpha* (Pallas, 1771) (Šporka and Nagy 1998; Yakovlev and Yakovleva 2010). *Hypania invalida* finds shelter and food among *Dreissena polymorpha* shells. Since we sampled with a multi-habitat method, we cannot link species occurrence to a specific substrate type. Nevertheless, soft sediment is a common substrate among the boulders of the Elbe River riprap zone, and *Dreissena polymorpha* is widespread in the studied part of the Elbe River.

Due to its preferences for soft bottom patches, Zorić et al. (2011) considered *Hypania invalida* to have only a limited influence on the overall benthic community. Devin et al. (2006) also stated that *Hypania invalida* has a low competitive value. However, its population densities can reach very high numbers (> 10 000 ind./m^2) (Vanden Bossche et al. 2001; Woźniczka et al. 2011) and at least a partial impact on river ecosystems cannot be excluded.

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References

Beran L (2000) First record of *Corbicula fluminea* (Mollusca: Bivalvia) in the Czech Republic. *Acta Societatis Zoologicae Bohemicae* 64: 1–2

Bij de Vaate A, Jadzdewski K, Ketelaars HAM, Gollash S, Van der Velde G (2002) Geographical patterns in range extension of Ponto-Caspian macroinvertebrate species in Europe. *Canadian Journal of Fisheries and Aquatic Sciences* 59: 1159–1174, http://dx.doi.org/10.1139/f02-098

Devin S, Akopian M, Fruget JF, DiMichelle A, Beisel JN (2006) Premiéres observations écologiques dans les hydrosystémes Français Polychéte d'eau douce *Hypania invalida* introduit en Europe occidentale. *Vie et Milieu – Life and Environment* 56 (3): 1–8

Eggers TO, Anlauf A (2008) *Hypania invalida* (Gruber, 1860) (Polychaeta: Ampharetidae) in der Mittleren Elbe. *Lauterbornia* 62: 11–13

Glasby CJ, Timm T (2008) Global diversity of polychaetes (Polychaeta; Annelida) in freshwater. *Hydrobiologia* 595: 107–115, http://dx.doi.org/10.1007/s10750-007-9008-2

Horecký J, Šporka F, Stuchlík E (2005) First record of *Hemimysis anomala* Sars (Crustacea: Mysidacea) from Czech strech of Elbe river (Czech Republic). *Lauterbornia* 55: 89–91

Leprieur F, Beauchard O, Blanchet S, Oberdorff T, Brosse S (2008) Fish invasions in the world's river systems: when natural processes are blurred by human activities. *PloS Biology* 6:404–410, http://dx.doi.org/10.1371/journal.pbio.0060322

Leuven RSEW, van der Velde G, Baijens I, Snijders J, van der Zwart Ch, Lenders HJR, Bij de Vaate A (2009) The river Rhine: a global highway for dispersal of aquatic invasive species. *Biological Invasions* 11: 1989–2008, http://dx.doi.org/10.1007/s10530-009-9491-7

Norf H, Kniggendorf LG, Fischer A, Arndt H, Kureck A (2010) Sexual and reproductive traits of *Hypania invalida* (Polychaeta, Ampharetidae): a remarkable invasive species in Central European waterways. *Freshwater Biology* 55: 2510–2520, http://dx.doi.org/10.1111/j.1365-2427.2010.02481.x

Straka M, Špaček J (2009) First record of alien crustaceans *Atyaephyra desmarestii* (Millet, 1831) and *Jaera istri* Veuille, 1979 from the Czech Republic. *Aquatic Invasions* 4: 397–399, http://dx.doi.org/10.3391/ai.2009.4.2.18

Špaček J, Koza V, Havlíček V (2003) Isopoda, Amphipoda and Decapoda on monitoring profiles on Labe River in the Czech Republic. In: Bitušík P, Novikmec M (eds), Proceedings of the 13th Conference of SLS and CLS, Banská Štiavnica, June 2003. *Acta Facultatis Ecologiae* 10, Suppl. 1: 309

Šporka F (1998) The typology of floodplain water bodies of the Middle Danube (Slovakia) on the basis of the superficial polychaete and oligochaete fauna. *Hydrobiologia* 386: 55–62, http://dx.doi.org/10.1023/A:1003587930283

Šporka F, Nagy Š (1998) The macrozoobenthos of parapotamon-type side arms of the Danube river in Slovakia and its response to flowing conditions. *Biologia, Bratislava* 53(5): 633–643

Tittizer T, Schöll F, Banning M, Haybach A, Schleuter M (2000) Aquatische Neozoen im Makrozoobenthos der Binnenwasser-starssen Deutschlands. *Lauterbornia* 39: 1–72

Vanden Bossche J-P, Chérot F, Delooz E, Grisez F, Josens G (2001) First record of the Pontocaspian invader *Hypania invalida* (Grube, 1860) (Polychaeta: Ampharetidae) in the River Meuse (Belgium). *Belgian Journal of Zoology* 131(2): 183–185

Yakovlev VA, Yakovleva AV (2010) Polychaeta *Hypania invalida* (Polychaeta: Ampharetidae) in the Kuybyshev Reservoir: Distribution and size and weight parameters. *Russian Journal of Biological Invasions* 1(2): 153–159, http://dx.doi.org/10.1134/S2075111710020141

Woźniczka A, Gromisz S, Wolnomiejski N (2011) *Hypania invalida* (Grube, 1960), a polychaete species new for the southern Baltic estuarine area: the Szczecin Lagoon and the River Odra mouth. *Aquatic Invasions* 6: 39–46, http://dx.doi.org/10.3391/ai.2011.6.1.05

Zorić K, Jakovčev-Todorović D, Đikanović V, Vasiljević B, Tomović J, Atanacković A, Simić V, Paunović M (2011) Distribution of the Ponto-Caspian polychaeta *Hypania invalida* (Grube, 1860) in inland waters of Serbia. *Aquatic Invasions* 6: 33–38, http://dx.doi.org/10.3391/ai.2011.6.1.04