



CURRENT KNOWLEDGE OF THE DISTRIBUTION OF INVASIVE MOLLUSC SPECIES IN SLOVAKIA

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ABSTRACT: The problem of introduced plant and animal species has become increasingly important in recent years. Some of these species are found only in greenhouses or thermal waters (*Helisoma trivolvis*, *Menetus dilatatus*, *Melanoides tuberculata*, *Planorbella duryi*, *Holandriana holandrii*, *Gulella io*, *Opeas goodallii*, *Zonitoides arboreus*, *Pseudosuccinea columella*), others expand quickly and efficiently to favourable habitats (*Potamopyrgus antipodarum*, *Physella acuta*, *Arion rufus*, *A. lusitanicus*, *Sinanodonta woodiana*, *Corbicula fluminea*, *Dreissena polymorpha*) or form small populations there (*Ferrisia clessiniana*, *Lucilla singleyana*, *Boettgerilla pallens*). This paper presents all information on the distribution of invasive mollusc species in Slovakia, both published and unpublished, available to date.

KEY WORDS: Mollusca, introduced species, Slovakia, invasion

INTRODUCTION

Problems resulting from introduction of plant and animal species have become increasingly serious for the last few decades. This pertains first of all to the so called invasive species which often have a negative effect on the native fauna and/or become pests. Ignoring their presence might lead to impoverishment

of native animal and plant communities, economic losses and the process of their spreading may become impossible to stop. The “invasive” category includes also some mollusc species (ŠTEFFEK 1996a, DVOŘÁK & ČEJKA 2003).

ANALYSIS OF PUBLISHED DATA

Prior to 1980 hints of introduced and invasive species of molluscs appeared in the Slovak literature only occasionally. The earliest published information (GROSSINGER 1794) pertains to an invasive Ponto-Caspian mollusc *Dreissena polymorpha* (Pallas, 1771) from the Danube River. Data on the species are also contained in subsequent papers (BRTEK 1953, LÁNG 1964, PACHINGER 1968). The invasive Western European slug *Arion rufus* (Linnaeus, 1758) was discussed by SOÓS (1943), LOŽEK (1962) and ŠTEFFEK (1977, 1978a). Records of a North-American snail *Physella acuta* (Draparnaud, 1805) were provided by LOŽEK (1956, 1964), BRTEK & ROTHSCHHEIN (1964) and ŠTEFFEK (1978b). Molluscs of greenhouses in the Bo-

tanic Garden in Bratislava and a garden centre and recreational services in Karlova Ves were described by FLASAR & KROUPOVÁ (1976a, b); samples were taken by V. KROUPOVÁ in 1973 and 1974. In their paper the authors mentioned exotic species originating from Africa – *Melanoides tuberculata* (O. F. Müller, 1774), *Ferrisia clessiniana* (Jickeli, 1882), *Gulella io* Verdcourt, 1974; North America – *Physella acuta* (Draparnaud, 1805), *Helisoma* cf. *trivolvis* (Say, 1817), *Zonitoides arboreus* (Say, 1817); South America – *Pseudosuccinea columella* (Say, 1817) and from the tropical Central America – *Opeas goodallii* (Miller, 1822).

Since the 1980s larger publications (ŠTEFFEK 1996a, 1997a), as well as short articles dealing with the

above-mentioned as well as other invasive species have started to appear: *Potamopyrgus antipodarum* (Gray, 1843) (ČEJKA 1994, 1997, KOŠEL 1995a, ŠTEFFEK 2000a, ŠTEFFEK & LUČIVJANSKÁ 2002), *Sinanodonta woodiana* (Lea, 1834) (KOŠEL 1995b, 1999, HALGOŠ 1999, ŠTEFFEK & LUČIVJANSKÁ 2002, ŠTEFFEK & ERÖSS 2003, ŠTEFFEK et al. 2004, NAGEL & ŠTEFFEK 2004), *Dreissena polymorpha* (ŠTEFFEK 1982, 1997b, 1999b, 2000b, LUČIVJANSKÁ & ŠTEFFEK 1991, KUČERAVÝ 1995, ELEXOVÁ 2000, ŠTEFFEK & LUČIVJANSKÁ 2002),

Corbicula fluminea (O.F. Müller, 1774) (ŠTEFFEK et al. 2002, VRABEC et al. 2003), *Arion rufus* (Linnaeus, 1758) (ŠTEFFEK & POTÚČKOVÁ 1984, ŠTEFFEK 1996b, 1997b, 1997c, 1999a, 2000b, 2000c, 2003, 2004, 2005, ŠTEFFEK & ERÖSS 2003, ŠTEFFEK & GREGO 2001, ŠTEFFEK & BIELČIK 2004), *Arion lusitanicus* Mabilie, 1868 (ČEJKA 2005, DVOŘÁK & ČEJKA 2003, 2004, ŠTEFFEK 2004).

DISCUSSION

Authors of the early records of some species from Slovakia (*Dreissena polymorpha*, *Physella acuta*) did not realise that they were not native, since some of them had been known in the area already in the 18th century. The earliest record of the Ponto-Caspian *Dreissena polymorpha* from Bratislava dates back to 1794 (GROSSINGER 1794). Until 1980 the species was mentioned in only about ten publications, most sites being located close to the Danube River (LOŽEK 1955, 1956, 1964, LUČIVJANSKÁ & RICHNOVSZKY 1984, LISICKÝ 1991) and in the Hronská pahorkatina hills (LISICKÝ 1991). Now the species is known to occur also in the Borská lowland (ŠTEFFEK 1997b), the Malé Karpaty – Buková dam and Chtelnická valley (J. ŠTEFFEK, unpubl., 13.10.1993).

Likewise, *Physella acuta* has been known in Slovakia since the early 20th century. It was regarded as a Mediterranean element, despite the fact that it originated from North America. LOŽEK (1956) regarded it as a species probably native to the Danube localities from Petrčalka to Štúrovo. Until 1981, LISICKÝ (1991) accumulated only ten records, mostly from waters close to the Danube (Podunajská lowland, Hronská pahorkatina hills), Morava, (Borská lowland), several records from the river Nitra (Nitrianska pahorkatina hills) and Východoslovenská lowland. The author of the present article collected data from various localities in entire Slovakia – the Vyhniansky brook in the Štiavnica hills (J. ŠTEFFEK 21.4.2002), Zemplínska Šírava (L. VAVROVÁ 16.9.2003), Podryba in Banská Bystrica (M. TRNÍK 6.10.2001), Ihráč dam (J. ŠTEFFEK 24.6.1989), Vyšný ěipov (J. ŠTEFFEK 28.7.1987), Nováky (J. ŠTEFFEK 16.5.1995), niva Slatiny in Zvolenská kotlina (L. Šedivková 28.8.2002), Senecké jazerá (J. ŠTEFFEK 22.4.1997), Sĺňava (J. ŠTEFFEK 17.1.1997), Levické ponds (ŠTEFFEK et al. 2005).

The Western European slug *Arion rufus* can be also added to the list of introduced invasive species. It was mentioned in 1962 by LOŽEK from Pezinok. In 1968 it was found in Bratislava (ŠTEFFEK & POTÚČKOVÁ 1984), in 1972 in Banská Štiavnica (ŠTEFFEK 1977, 1978a), Vyhne (LISICKÝ 1979) and later also in other towns of Slovakia – Ruťomberok, Trstená, Stupava, and Zvolen (LISICKÝ 1991). At present the species is

known from many towns and villages of Slovakia (Banská Bystrica, Banský Studenec, Vyhne, Zemianska Dedina na Orave, Jasenov, Podskalka, Veľká Domaša, Krupina, Považská Bystrica, Prečín, Veľká Čierna, Hermanovce). Now it has become necessary to revise all the records of this species, since some of them may represent a morphologically identical *Arion lusitanicus* (WIKTOR 2004; see also below).

In recent years another Western European species, *Arion lusitanicus*, has started spreading rapidly and appears to be much more efficient and more of a pest than *Arion rufus*. Since the beginning of the 1970-ies it has spread from its original range in Spain to almost the whole of Central and Southern Europe. In Slovakia it was found in Bratislava, Štiavnica hills and Podunajská lowland, but probably is more widespread (DVOŘÁK & ČEJKA 2003). After a rain it was seen in masses in some villages of Zvolenská kotlina (ŠTEFFEK 2004).

Sinanodonta woodiana is an invasive bivalve. It spread to Europe as parasitic larvae (glochidia) with introduced fishes: silver carp *Hypophthalmichthys molitrix* and bighead carp *Aristichthys nobilis* from south-eastern Asia. Because of its fast reproduction, in a short time it is likely to invade all larger streams and lakes of Slovakia. Because of its large size, the Chinese clam can be a serious competitor for our autochthonous species. It started spreading at about 1995, when it was collected by J. ŠTEFFEK in an inundation area of the river Ipeľ at Tešmark (ŠTEFFEK et al. 2005); in the same year also V. KOŠEL found it in an inundation zone of the Danube at Číčov (KOŠEL 1995b). By the end of the 1990s it was found by HALGOŠ (1999) and KOŠEL (1999) in great numbers in Ipeľ near Chľab. Until 2002 these were the only published data from Slovakia. Within the last two years the Chinese clam was found in Kolárovo (K.O. NAGEL 1.9.2003), Moravský Sv. Ján (K.O. NAGEL 27.9.2003), in a canal in Čierna voda near Závadka, which flows out from the Zemplínska Šírava (NAGEL & ŠTEFFEK 2004) and in Laborec near Stretávka (K.O. NAGEL 12.8.2004).

Another, potentially invasive, bivalve *Corbicula fluminea* originates probably from Asia. The first data from Slovakia come from the Danube at Radvaň-on-



-Danube (T. ČEJKA 16.5.2002), near Komárno (M. HORSÁK 13.6.2002) and from the left branch at the Starý prístav, Gabčíkovo (D. KRÁL 13.9.2002) (VRABEC et al. 2003). The author of this article found it in the Danube near Chľab in 1999 and K.O. NAGEL – in the Danube near Kravany-on-Danube (12.7.2002) and in Karloveské rameno in Karlova ves (26.2.2003).

The New Zealand snail *Potamopyrgus antipodarum* was found by V. KOŠEL for the first time in Slovakia in

1986 (KOŠEL 1995a). Another record comes from Čenkovo, where it was collected on 7.4.1994 by J. ŠTEFFEK. Several records from the Danube were published by ČEJKA (1994, 1995). Since that time it was also found in the Senecské lakes (ŠTEFFEK 2000a) and in the pond Podryba in Banská Štiavnica.

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