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Research article

Occurrence of paddlefish *Polyodon spathula* (Walbaum, 1792) in the Serbian part of the lower River Danube

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Abstract

Paddlefish *Polyodon spathula* was recently found in the lower River Danube of Serbia. Its introduction in the Danube is most likely to result from fish escaping from Romanian or Bulgarian rearing facilities where it was introduced in the 1990's. It now occurs as far up as the Iron Gate II (863 – 862 km from the Black Sea) and appears to have acclimatised to the lower River Danube.

Key words: *Polyodon spathula*, Acipenseriformes, non-native fish, introduction, pathways, acclimatisation

Introduction

Several new non-native fish species were recently recorded in the Serbian section of the Danube River. Some of them, e.g. the Ponto-Caspian gobies: monkey *Neogobius fluviatilis*, round *N. melanostomus*, bighead *N. kessleri*, racer *N. gymnotrachelus* and tubenose *Proterorhinus semilunaris* (Simonović et al. 2001) that are invasive (sensu Richardson et al. 2000) actively dispersed and naturalised in the Serbian section of the River Danube after their initial accidental introduction via ballast waters. Others, e.g., the Amur sleeper *Perccottus glenii* that were accidentally introduced with fish stocking into the Tisa River (Koščo et al. 2003) are acclimatised in the Danube River (Simonović et al. 2006). There are, however, fish species that were introduced deliberately, most often through the fish farming trade. For example species originating from Asia comprising *Ctenopharyngodon idella*, *Hypophthalmichthys mollitrix* and *Arystichthys nobilis*, which were initially introduced into Romanian fish farms in 1960 (Copp et al. 2005) and into Serbia in 1963 (Cakić and Hristić 1987) but naturalised in the Serbian section of the River Danube in the early 1990s (Janković 1992, 1998; Cakić et al. 1996).

Paddlefish *Polyodon spathula* (Walbaum 1792) (Acipenseriformes: Polyodontidae), which is native to the Mississippi River basin (McClanes 1974), was first introduced into Russian waters in 1974 (Reshetnikov et al. 1997). Reinartz (2002) reported that paddlefish were originally imported from the USA to Romania for acclimatisation and rearing on fish farms with a rate of introduction of about 2000 fish per year in some places between 1992 and 1994 (Vedrasco et al. 2001). Paddlefish

are currently reared in fish farms in Germany and Austria, Czech Republic and Bulgaria (Bogutskaya and Naseka 2006, Prokeš et al. 2000, Hubenova et al. 2005).

Materials and Methods

The sampling area is located at the Danube River downstream of the Iron Gate II dam in the area of the village of Prahovo, at river 863-862 km from the Black Sea (44º17'32"N and 22º35'34"E). Fish were caught by local fisherman using a drifting trammel net with mesh size of 3.5 cm. Fish were measured to the nearest millimetre and weighed to the nearest hundredth of a gramme both on the field and in the laboratory. Sex was determined by dissection.

Results

Two specimens of paddlefish *Polyodon spathula*, one male and one female, were caught on May the 10th 2006. They were both measured at 82 cm standard length (SL). The weight of the male was 5.5 kg (weight of the female is not available). The paddle of the female was much longer than that of male (26 cm and 16 cm, respectively). A third male paddlefish was caught on 1 June 2006 and delivered to the University of Belgrade. The specimen measured 97 cm with a standard length of, a weight of 6.5 kg and a paddle of 29.5 cm (Figure 1). That specimen remained preserved as taxidermy (i.e., a dermoplastic model) at the teaching collection of the Faculty of Biology, University of Belgrade.

Figure 1. The paddlefish from the lower Danube River of Serbia, delivered to the University of Belgrade, Faculty of Biology (photo by S. Marić and P. Simonović)

Discussion

These records of adult paddlefish in the Serbian section of the River Danube come nearly six years after the first record of adult paddlefish from the Bulgarian part of the River Danube (426 km from the Black Sea, Kutsarov 2005). Considering that paddlefish occur exclusively in the lower River Danube, it seems that they are escapees from either Romanian, or Bulgarian fishponds. Vasilev and Pehlivanov (2005) reported on juvenile paddlefish being found in the lower Danube River, which indicates that paddlefish have already acclimatised there.

In order to conserve Danube sturgeon stocks, Reinartz (2002) recommended that both accidental or non-accidental introductions of alien acipenseriform species into the Danube River must be avoided by all means, due to the strong potential for hybridisation in acipenseriforms (Birstein et al. 1997). Although there are no available field data about the hybridisation between paddlefish and native sturgeon species of the River Danube, there is a strong possibility of them to sharing spawning sites considering their similar reproductive requirements (timing and spawning grounds habitat) Wallus 1986).

At the moment it is difficult to predict if paddlefish will pass the Iron Gate reservoirs and migrate upstream into the middle Danube but various life history characteristics of paddlefish including feeding (Rosen and Hales 1981, Smith 2001) and swimming capabilities (Purkett 1961, Yeager and Wallus 1982) make it particularly well adapted to the River Danube. Although there is a potential biological resistance with the predation of paddlefish larvae by zander *Stizostedion lucioperca* and wells *Silurus glanis*, the lack of active measures for prevention of upstream spreading of non-indigenous fish

species in the Danube River leaves the outcome of dispersal purely a matter of chance.

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