

# Distribution of the Ukrainian Brook Lamprey *Eudontomyzon mariae* (Berg, 1931) (Cephalaspidomorphi: Petromyzontidae) in Bulgarian Protected Zones along the Danube River

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**Abstract:** The Ukrainian Brook Lamprey *Eudontomyzon mariae* (Berg, 1931) is an European protected species, which is included in the Bulgarian Red Data Book as critically endangered. It was believed to be almost extinct in certain areas some decades ago, but recently it has been recorded more frequently. New data about its occurrence in the Natura 2000 protected zones along the lower Danube River in Bulgaria raise the question if it is still necessary to include *E. mariae* in the Bulgarian Red Data Book or to open the discussion for changing its conservation status. Additional data about the current distribution of this species are needed to answer this question.

**Key words:** Ukrainian brook lamprey, Danube River, endangered species, population density.

## Introduction

The Ukrainian brook lamprey *Eudontomyzon mariae* (Berg, 1931) is distributed in rivers flowing into the Baltic Sea (Odra, Vistula and Neman), northern Black Sea (from the Danube to Kuban) and Caspian Sea (Sura and Volga). Along the Danube River, it has been recorded below the Iron Gates, with a single exception from the Upper Morava River (KOTTELAT & FREYHOFF 2007). In Bulgaria, it has been classified as critically endangered (CR) since 1985 (STEFANOV 2015). According to the IUCN RED DATA LIST (2018), this species is classified as Least Concerned. It is also recognised as a target species for the Natura 2000 network and, thus, being a subject of monitoring. In Bulgaria, data about its distribution and ecology are scarce, mainly because electrofishing in fish related studies has been introduced rather recently (during the last decade) as well as because the first monitoring programmes within the EU Water Framework Directive have started after 2008.

*Eudontomyzon mariae* is well known from the

middle stretch of the Danube River: from rkm 1880 to rkm 942 (HOLČÍK 1995, 2003). Several decades ago, it was assumed as almost locally extinct in several areas but recently its population density seems increasing (HOLČÍK & DELIĆ 2000, HOLČÍK 2003).

In Bulgaria, except in the Danube River (DRENSKY 1951), it was also found in the catchment of some Danubian tributaries during the first half of the 20<sup>th</sup> Century: Osam, Iskar, Rusenski Lom and Yantra Rivers (STEFANOV 2015, STEFANOV & HOLČÍK 2007). A lamprey has also been reported from the Vacha River in Maritsa (Evros) Basin but the species identification of lampreys from this river remains uncertain. There are no recent data about its occurrence outside the Danube River, with a single recent exception being a record from Rusenski Lom River (STEFANOV & HOLČÍK 2007). Industrialisation and increasing habitat fragmentation during the second half of 20<sup>th</sup> Century most probably had an impact on the distribution of the species in the Danubian tributaries. More recently, it has been re-

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corded in the Bulgarian sector of the Danube River during the Joint Danube Survey 3 (JDS3) in 2013 but not during the Joint Danube Survey 2 (JDS2) in 2007.

The aim of this article is to report new data on the distribution of *E. mariae* in the Bulgarian sector of the Danube River and to review its records from the adjacent water bodies, with a special focus on the Natura 2000 protected areas.

## Materials and Methods

The material was collected by boat electrofishing with gear adequate for large rivers, equipped with boom- and hand held anode. In 2014 and 2015, a total of 15 sites were sampled in the Bulgarian sector of the Danube River, from the river km 610 to the rkm 375. Some of the sampling sites were the same as the ones used during JDS 3 in 2013 (Fig. 1). A minimum of 10 transects during the day and 5 transects during the night, with a minimum length of 100 m per transect, were sampled per site by electrofishing. The captured specimens were measured ( $\pm 0.5$  cm total length) and released. Habitat type, main sediment characteristics, coordinates and transect length and width were registered. The species identification followed STEFANOV & HOLČÍK (2007).

## Results

A total of 65 specimens of *E. mariae* from eight sampling sites (Table 1) were recorded along the

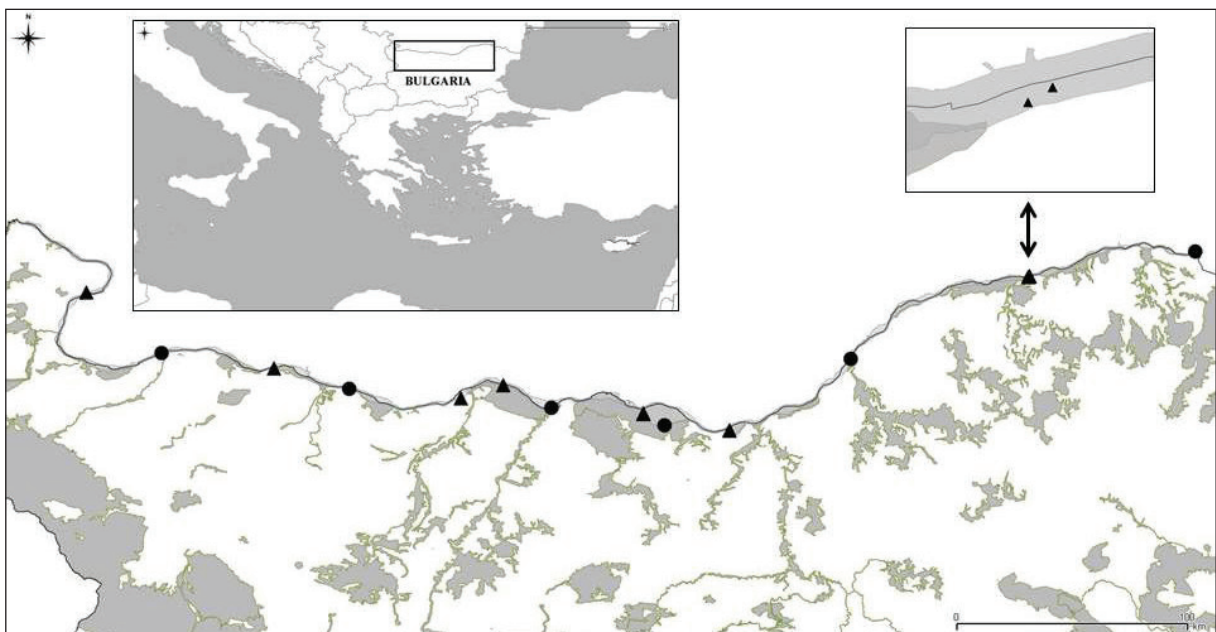
Bulgarian sector of the Danube River. The Ukrainian brook lamprey is included as a protected species for 22 Natura 2000 zones (MOEW 2018), four of which do not include any parts of the Danube River main stream. From the 20 examined sites, *E. mariae* was recorded at three sites within Natura 2000 and at five sites outside Natura 2000 network (Fig. 1). The recorded abundances varied from 17 to 525 ind./ha. Independently from the main sediment type of the sampling site, the species inhabited primarily sandy and partially silty microhabitat types. All specimens were at the larval stage, with size 7-20 cm.

During electrofishing, *E. mariae* showed better resistance to the electric field than teleost species, hence more time for the induction of a galvanotaxis was needed; in some cases up to 15 seconds for extraction from substrate. Due to the behaviour of this species (buried in the substrate), electrofishing with a powerful device was the best way of sampling.

## Discussion

As a protected species by national and European legislation, data concerning distribution of *E. mariae* are essential for its conservation. Previous occurrence data in Natura 2000 (Table 1) do not correspond to the recent findings. On the basis of former and current data, the Danubian population of *E. mariae* seems rather evenly distributed in suitable habitats within the Bulgarian section of the Danube River.

The recent registrations may result from increased electrofishing sampling, which is being



**Fig. 1.** Sampling sites of *Eudontomyzon mariae* along the Bulgarian sector of the Danube River. Near Tutrakan, two adjacent sites were sampled. Legend: ● – older data; ▲ – current data; light grey – Danube River; grey – Natura 2000 zones.

**Table 1.** Recent records of *Eudontomyzon mariae* in the Bulgarian sector of the Danube River.

River km	Site Name	Year	Substrate Type	Total no. of individuals	Ind./ha	Natura 2000	Source
640-641	Baykal	2014	Sand	1	17	No	Present study
796-797	Near Vidin (Calafat)	2014	Silt	1	56	No	Present study
703-704	near Kozloduy	2014	Sand	1	67	No	Present study
624-626	Downstream of Iskar River estuary (Zagrazhden)	2014	Silt	1	83	BG0000355	Present study
576-577	Upstream of Belene (after Turnu Magurele / Nikopol)	2015	Sand	44	525	BG0000396	Present study
546-547	Downstream of Zimnitsa /Svishtov	2015	Gravel / Pebble / Cobble	5	139	BG0002018	Present study
432-433	Tutrakan (before Ardzhesh River estuary)	2015	Gravel / Pebble / Cobble	9	500	No	Present study
431-432	Ardzhesh River estuary	2015	Sand	3	26	No	Present study
522-523	Near Batin	2011	Unknown	1	31	BG0000377	Natura 2000
393-394	Near Vetren	2011	Unknown	2	160	BG0000241	Natura 2000
436-437	Near Tutrakan	2011	Unknown	1	40	BG0000232	Natura 2000
634-624	Downstream of Iskar	2013	Unknown	5	Unknown	Unknown	JDS 3
602- 597	Downstream of Olt	2013	Unknown	6	Unknown	Unknown	JDS 3
491-489	Downstream of Ruse-Giurgiu	2013	Unknown	17	Unknown	Unknown	JDS 3
383-373	Chiciu/Silistra	2013	Unknown	5	Unknown	Unknown	JDS 3

used for fish monitoring in Bulgaria since about a decade. These results could represent a basis for further cogitation, in order to decide if *E. mariae* is reasonably included in the Bulgarian Red Data Book. Nevertheless, a longer series of data is needed to decide whether to change the protection status of this species.

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