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LAMPETRA PLANERI (BLOCH, 1784) OF THE ŚLUPIA RIVER IN THE ŚLUPSK CITY AREA

Krystian Obolewski

*Department of Water Ecology, Pomeranian Academy,
ul. Arciszewskiego 22b, 76-200 Słupsk, Poland
e-mail: obolewsk@pap.edu.pl*

Abstract

The Ślupia River in the urbanized section within the limits of Słupsk was investigated in terms of lamprey fish presence. Among 25 studied sampling sites only 5 were inhabited by the discussed species in autumn and 4 in summer, all in the very center of the city. The investigated lamprey fish representatives preferred slightly transformed sites with considerable water oxygenation and fast water flow. No *L. planeri* representatives were noticed up the Szczecin-Gdańsk bridge, therefore its frequency reached 16% in summer and 20% in autumn. During the summer study 5 representatives of the brook lamprey were noticed, while in autumn 10, with no distinct sexual features but with developed suckers and fins, which indicated the metamorphosis starting in summer and lasting until the next year spring spawning. The caught brook lampreys were between 130 and 176 mm long and weighed from 0.9 to 14.7 g. Average length and biomass were higher in autumn and reached consequently 156 mm and 6.3 g comparing to 142 mm and 1.2 g in spring.

Key words: *Lampetra planeri*, Słupsk city

INTRODUCTION

The Ślupia River is one of the longest water courses in the Middle Pomerania, which flows into the Baltic Sea in Ustka. The most valuable representatives of ichthiofauna in this aquatic ecosystem are: salmon trout (*Salmo trutta m. trutta* L.), Atlantic salmon (*Salmo salar* L.) and a few legally protected fish species like spined loach (*Cobitis taenia* L.), Eurasian minnow (*Phoxinus phoxinus* L.) and European bitterling (*Rhodeus sericeus amarus*, Bloch). Jointly 27 fish species inhabit the Ślupia basin. Apart from fish also primitive vertebrates occur, mainly river and brook lampreys (*Lampetra fluviatilis* L. and *Lampetra planeri*, Bloch).

Lampreys are becoming rarer in the environment due to eutrophication, land improvement, hydro-technical development and other anthropogenic transformations of watercourses. Therefore, since 2001 (DzU 13, pos. 61), all the lamprey species are legally protected and included into the Polish Red Book of Animals, category V

(vulnerable species), which means they would gradually disappear and extinct unless the unfavourable condition change (Witkowski 2004).

In the area of Poland the most common lamprey species is brook lamprey, which inhabits mainly the basins of Odra, Łaba, Vistula rivers and also the coastal rivers. All of them are located in the catchment area of the Baltic Sea.

MATERIALS AND METHODS

The investigation was carried out during four seasons in 2006 at 25 sampling sites located in the Słupia River within the city of Słupsk (Fig. 1). The sampling sites differed in the localization in the river bed, water flow velocity, substrate type, depth and shore shading. Samples were taken in the coastal zone of the river course using a net dipper. The caught lampreys were counted, measured, weighed and set free back to the river.

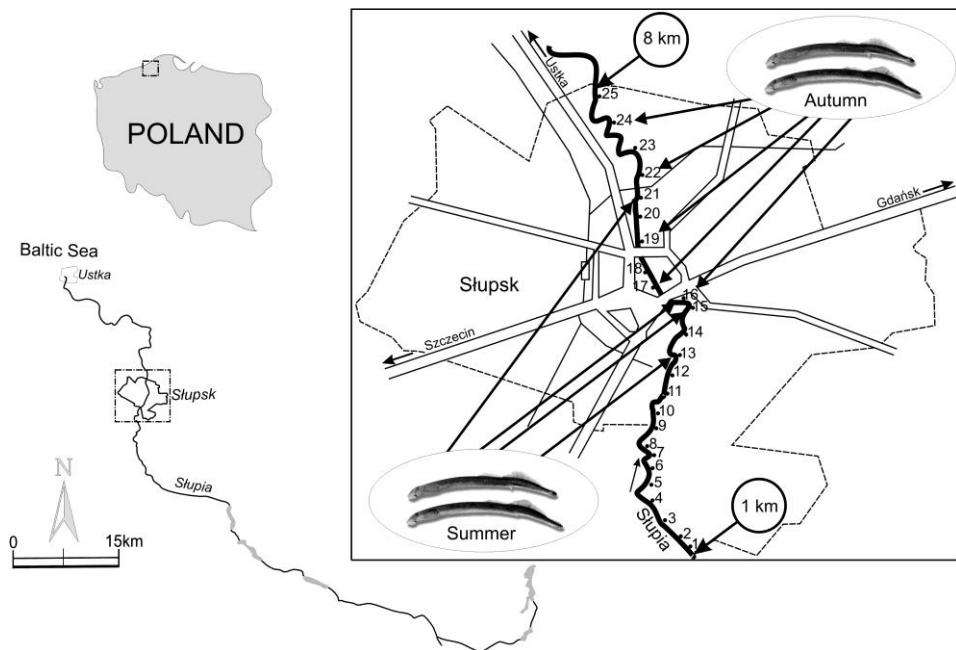


Fig. 1. Localisation of sampling sites and the place of appearing of *Lampetra planeri*

RESULTS AND DISCUSSION

The study revealed the presence of brook lamprey *Lampetra planeri* (Bloch, 1784) in the centre of the city. Its occurrence was limited to summer and autumn seasons and to the 2 km section of the river course in the downtown. No *L. planeri* repre-

Table I

Characteristic of sampling sites on which there were *Lampetra planeri* (Bloch, 1784)

Seasons	Sites	pH	Eh (mV)	[O ₂] (%)	[O ₂] (mg dm ⁻³)	Tempe- rature (°C)	[Cl] (mg dm ⁻³)	Depth (m)	Level transforming of trough	Type of bottom
Autumn	16	7.91	333	87.8	7.43	12.9	0.185	0.4	steep bank	sand
	17	7.72	318	46.1	3.90	12.8	0.190	0.3	middle	silt
	19	8.05	352	42.3	3.58	12.9	0.208	0.4	middle	sand
	22	7.96	323	79.6	6.74	12.9	0.185	0.8	low	sand
	24	7.94	323	102.1	8.65	12.9	0.196	0.5	low	sand
	13	7.88	347	76.8	6.66	18.9	0.193	0.4	middle	sand
Summer	15	7.85	344	72.3	6.34	19.4	0.176	0.2	middle	sand + silt
	16	7.99	358	77.0	6.71	18.0	0.175	0.3	steep bank	sand
	21	7.78	344	75.5	6.58	19.4	0.178	0.5	low	stones

sentatives were noticed up the Szczecin-Gdańsk bridge, therefore its frequency reached 16% in summer and 20% in autumn.

The brook lamprey sites of occurrence were slightly or moderately anthropogenically transformed, with water depth between 0.3 and 0.7 m. As regards water chemistry, the discussed species preferred well-oxygenated environment with the concentration of dissolved oxygen within the range $3.58\text{--}8.65 \text{ mg O}_2 \text{ dm}^{-3}$, 42.3-102.1% saturation and stable salinity ($0.175\text{--}0.208 \text{ mg Cl dm}^{-3}$). Conductivity was also low while water temperature depended on the atmospheric conditions in a given season (Tab. 1).

During the summer study 5 representatives of the brook lamprey were noticed while in autumn 10, with no distinct sexual features but with developed suckers and fins, which indicated the metamorphosis starting in summer and lasting until the next year spring spawning (Penczak 1967). The caught brook lampreys were between 130 and 176 mm long and weighed from 0.9 to 14.7 g. Average length and biomass were higher in autumn and reached consequently 156 mm and 6.3 g comparing to 142 mm and 1.2 g in spring. The differences in size and biomass of the caught lampreys might be attributed to the presence of the larval forms during transformation when their length varies between 150 and 200 (210) mm and which are bigger than adult representatives. Decrease in length could be explained by a lower food intake (Penczak 1967).

One *L. planeri* representative per sampling site was noticed in summer while in autumn 2-3 individuals were observed with the highest abundance at the sampling site no. 17. Only one site (no. 16) was inhabited by lampreys both in summer and spring. That indicates a continuous migration of *L. planeri* in the urbanized region of the Stupia River, searching for the optimal habitat conditions.

The occurrence of the discussed species only in a short section of the river can be twofold explained. The adult individuals prefer gravelled and stony substrate and fast water flow, while larva inhabit only humus and sand with considerable content of organic matter (Rolik and Rembiszewski 1987, Witkowski 2004). This kind of bottom type was observed only at the sampling sites located in the centre of Stupsk. The second reason explaining the lack of the species at the first kilometres of the river course within the city is the hydro-technical development – the mill channel near the sampling site no. 17, the byway channel connecting the mill channel with the main river bed and the water gate between the sampling sites no. 10 and 11. This type of hydro-technical development and also river taming reduce the lamprey population (Witkowski 1995).

CONCLUSIONS

The presence of *L. planeri* in the Stupia River within the limits of Stupsk should be perceived as a favourable fact (Witkowski and Kotusz 1997). However, the brook lamprey is an endangered species and its further existence in the Stupia basin is conditioned on the intensity of anthropogenic influence, mainly water contamination, isolation of the local populations due to habitat fragmentarization, pressure of alien species, building dams without fish ladders, river course taming, river basin meliora-

tion, lowering the ground water level and gravel exploitation. Therefore, protection of the brook lamprey in the Słupia basin should consist in:

- improving water purity,
- assuring efficient fish ladders,
- protection of old river beds and oxbow lakes,
- maintaining the proper bottom type and wooded shores.

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LAMPETRA PLANERI (BLOCH, 1784) RZEKI SŁUPI NA OBSZARZE MIASTA SŁUPSKA

Streszczenie

Rzekę Słupię na zurbanizowanym odcinku (teren miasta Słupska) badano pod względem obecności ryb minogokształtnych. Spośród 25 wyznaczonych stanowisk jedynie w 5 miejscowościach jesienią i 4 latem (centrum miasta) zaobserwowano obecność minoga strumieniowego. W czasie badań w sezonie letnim pozyskano 5 przedstawicieli minoga strumieniowego, natomiast jesienią 10 osobników. Preferowały one mało przekształcone punkty pomiarowe, o dobrze natlenionej wodzie i szybkim nurcie. Frekwencja *L. planeri* w Słupi na odcinku miejscowości wyniosła 16% latem i 20% jesienią. Złowione przedstawiciele minoga strumieniowego miały wielkość wahającą się w granicach od 130 do 176 mm i masę od 0,9 do 14,7 g. Średnie wartości długości i biomasy były większe jesienią i wyniosły 156 mm i 6,3 g przy 142 mm i 1,2 g wiosną.