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SHORT COMMUNICATION

Length and weight distribution of the river lamprey, *Lampetra fluviatilis* (L.), sampled in the Nemunas River Estuary

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Abstract. Data on the population state, catch sizes, migration time, and intensity of the river lamprey, *Lampetra fluviatilis* (L.), are presented. Biological indexes of lamprey sampled in 2007-2009 in the lower reaches of the Nemunas River were analyzed. The study revealed that lamprey body length and weight characteristics have remained almost unchanged in recent years. However, it was found that reproducers had become smaller in size compared to investigation findings from the twentieth century.

Keywords: lamprey stocks, abundance dynamics, migrations, biological indexes

Data on the state of the lamprey population in Lithuanian rivers are still insufficient. It is assumed that approximately 100-150 thousand river lamprey, *Lampetra fluviatilis* (L.), migrate annually to the Nemunas River basin (Kesminas 2009). From 10 to 15 thousand lamprey migrate into the Šventoji River from the Baltic Sea. They also migrate into the basin of the Venta and Mūša rivers; however, their stock size has not been estimated yet (Bukelskis et al. 1998). During the spawning season they are observed in 17 Lithuanian rivers (Fig. 1). Lamprey in the Curonian Lagoon and the Nemunas Delta are classified as a low-priority commercial fish group. The largest catches were recorded in the nineteenth century, when Benecke (1881) caught about 240 thousand lamprey in Skirvytė Stream, one of the arms of the Nemunas River. According to information currently available on average weights of reproducers, during the interwar period catches of lamprey could have reached 24-25 tons per year. During the interwar period, catches of this fish were about ten times larger than those reported at present. According to Maniukas (1959), during the period mentioned above, catches of lamprey ranged from 30 to 53 tons per year. The statistics on catches indicate that lamprey catches in the twentieth century were on the increase with the exception of the last decade. The maximum catch recorded in 1995 was 13.2 tons. Available statistics show that in recent years catches of the European river lamprey have been fluctuating between 2 and 4 tons per year, which is equivalent to 30-40 thousand individuals. However, in practice, lamprey catches may be several times higher than those indicated by statistics.

Two phases can be distinguished in lamprey migration in Lithuania (Gaigalas 2001). This species migrates from the Baltic Sea to the Nemunas River in the second half of summer until the following May. The highest activity of lamprey migration is observed in October – December (Gaigalas 2001). Interviews with old fishers familiar with the Nemunas River

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Table 1
Mean lengths and weights of river lamprey in the Nemunas River Estuary in different years

Variable	1965[a]	1966[a]	1990[b]	2007[c]	2008[c]	2009[c]
Mean length (cm)	37.6	39.9	39.7	37.6	37.2	38.1
Mean weight (g)	97.0	118.6	124.6	103.1	99.0	101.2

[a]data after Gaigalas 2001
[b]data after Gaigalas et al. 1992
[c]current study

Table 2
Mean lengths and weights of river lamprey caught in the Nemunas River Estuary in November 2007-2009

		Total length (cm)			Body weight (g)			
Year	N	mean	SD	range	mean	SD	range	% females
2007	69	37.6	2.6	31-43	103.1	23.4	51-168	58
2008	76	37.2	2.4	31-43	99.0	22.4	64-146	56
2009	75	38.1	2.1	33-44	101.2	20.3	60-166	60

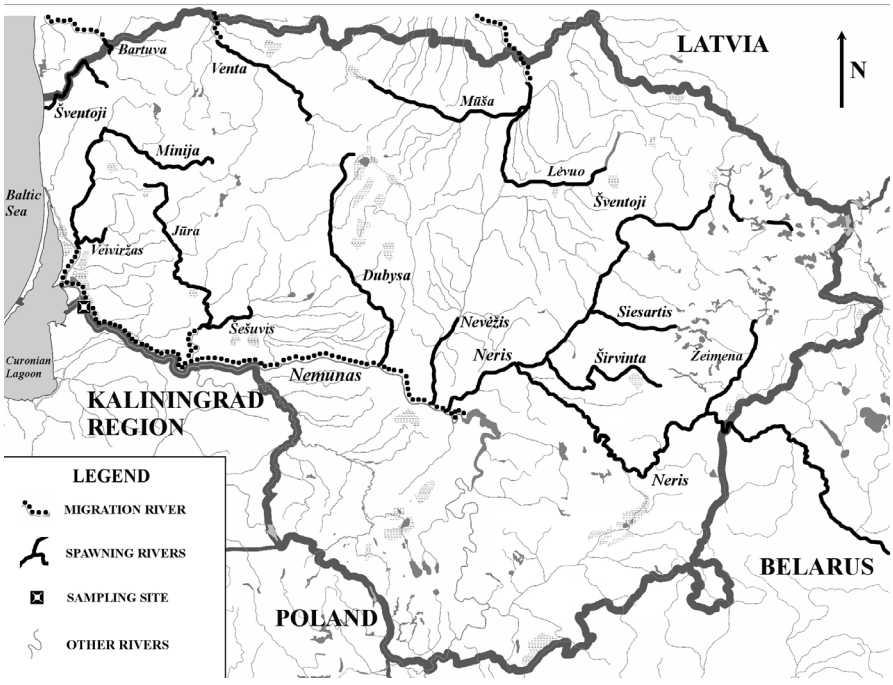

Figure 1. Location of spawning rivers of river lamprey in Lithuania and the research station.

provided evidence that before the construction of the Kaunas Hydroelectric Power Plant lamprey was caught during the autumn. Abundant statistical data confirm the fact that several decades ago lamprey migration was very intense in September (Gaigalas et al. 1992). In 2007 and 2009, intense lamprey migration was observed only in late autumn and early winter. The largest lamprey catches were recorded at the beginning of the thaw when snow melted into river waters. Intense lamprey migration from the Curonian Lagoon to rivers is recorded during April and May when water temperature reaches 7-12°C. Lamprey

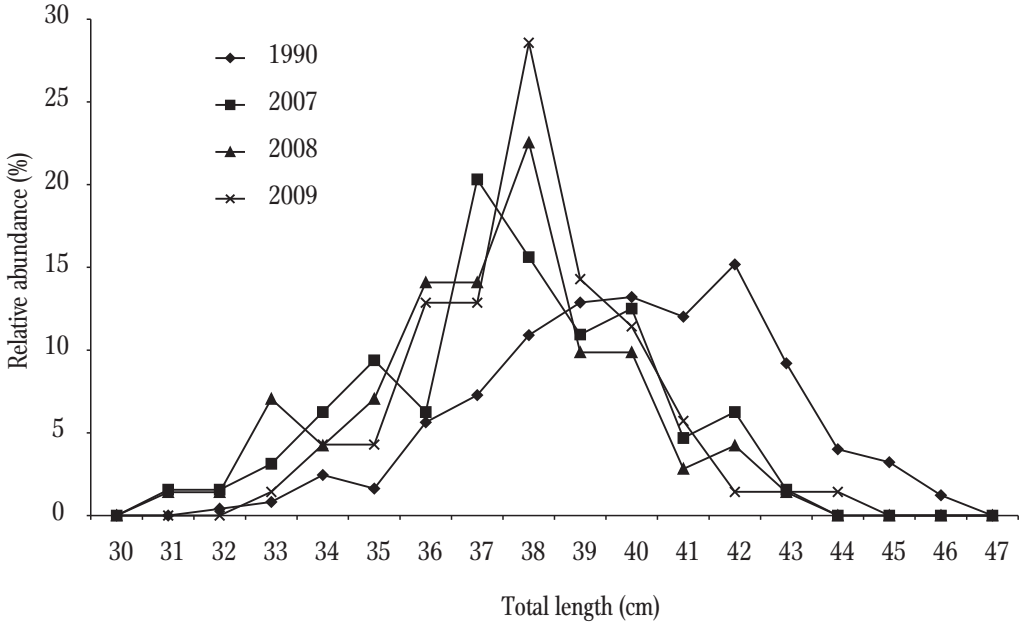

Figure 2. River lamprey length structure (%) in the Nemunas River Estuary.

from the Nemunas River primarily migrate to its tributaries – the Minija and Jūra rivers and further to the Dubysa, Nevėžis, Neris, and Šventoji rivers (Fig. 1).

Biological indexes of lamprey were more thoroughly investigated in the 2007-2009 period. Data were collected from commercial catches of fishers using lamprey pods. The material collected (220 individuals) was evaluated using standard techniques (Pravdin 1966, Thoresson 1993). The lamprey was caught in the Nemunas River Estuary in November 2007-2009. Total length (cm) and weight (g) of the lamprey were measured. Total lengths of lamprey collected in the Nemunas River Estuary in 2007 ranged from 31 to 43 cm, and total weights ranged from 51 to 168 g. The mean length of lamprey was 37.6 cm, and mean weight was 103 g (Table 1).

The total lengths of lamprey collected in 2008 ranged from 31 to 43 cm, and weights ranged from 64 to 146 g. In 2009, these measurements ranged from 33 to 45 cm and from 60 to 166 g, respectively (Table 2). At present, the modal group consists of individuals (from 57 to 67%) in the total body length range of 37-40 cm and the total weight range of 98-120 g (Fig. 2). The length-weight relationship can be expressed by the following formula:

$y = 8.2966x - 206.92$, $r^2 = 0.96$;

where: y – weight (g), x – total length (cm)

The comparison of the the measurements above with findings of previous studies (Gaigalas et al. 1992, Gaigalas 2001) revealed that the current length and weight of lamprey reproducers have decreased. The average length of lamprey in 1966 was higher than that in 1990 by several cm, and average weights were higher by 18-24 g compared to those in 1990 (Table 1). In recent years, the mean lengths of lamprey reproducers have changed: two-thirds of all reproducers are 36-40 cm in total length, while two decades ago the modal group of lamprey consisted of individuals whose total body length ranged from 38 to 43 cm (Fig. 2). However, in 2009, males, which are smaller in size than females, constituted 39% of total catches. Overall, the length and weight of lamprey male and female reproducers could be even smaller.

The current investigations and collected statistical data indicate that, despite such anthropogenic factors as dam construction, reclamation, and pollution, lamprey stocks in Lithuanian rivers are still large enough. A decline in reproducer morphometric parameters can be attributed to the deterioration of feeding conditions, i.e., a decline in fish stocks in the Baltic Sea.

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Streszczenie

Długość i masa minogów rzecznych, *Lampetra fluviatilis* (L.), z estuarium Niemna

W pracy przedstawiono wyniki badań populacji minoga rzecznego, *Lampetra fluviatilis* (L.) migrującego na tarliska zlokalizowane w dopływach Niemna (Litwa). Dokonano charakterystyki stanu populacji, okresu migracji tarłowej oraz wielkości minogów łowionych w latach 2007-2009. Długość ciała i masa łowionych minogów nie zmieniały się znacząco w analizowanych latach, jednakże znacznie obniżyły się w porównaniu do wielkości notowanych kilkanaście lat wcześniej.