

Some Regularities of Migrations of River
Lamprey (*Lampetra fluviatilis*) into the Latvian Rivers

by

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The lamprey run into rivers is extremely irregular; during a week's fishing for lamprey the run can sharply decrease two or three times or even stop completely. Therefore, the outline of lamprey migration forecasting methods is of great practical importance to fishermen. Many investigators have pointed out that lamprey migrations depend on hydrometeorological factors and on the influence of the moon phases. (Borisov P.G., 1913; Pravdin N.F., 1913; Domratchev and Pravdin, 1926; Mitropolsky S.A., 1916; Jakobson R.P., 1914, and others).

In order to receive practical results for fishermen the Latvian Institute of Fisheries has investigated fluctuations of the daily catches of lamprey in the Latvian rivers in connection with dynamics of the hydrometeorological regime and other factors.

In this report data for 1959-61 for the Gauya River, the main lamprey river of Latvia, are given.

1. Influence of the moon phases on lamprey catches

Borisov, P.G., Mitropolsky, S.A., Jakobson, R.P. (the Volga, Onega and Gauya rivers) pointed to this correlation. Our investigations for 1954-61 confirm the correctness of the data of these authors; in general, the best catches coincide with the periods of the last quarter of the moon or with the periods of the new moon; this correlation is clearly expressed in autumn and winter, but in the spring/summer period it is often broken. In general, about 60% of the annual lamprey catch in Latvia falls on the dark night periods (the new moon being in the last quarter).

2. Influence of the changes in the water level of the river on the lamprey catches

There is clear correlation between fluctuations of the lamprey catches by days and dynamics of the water level in the river and wind regime.

The general scheme of this correlation is as follows:-

a) Tidewinds reduce or detain river discharge; water level in lower reaches increases; lamprey runs into the river at that time are negligible.

b) Tidewinds cease and the outflow of freshwater into the sea increases sharply; simultaneously, the conditions of attraction and orientation of lamprey to the heavy freshwater flow going out of the river mouth are being greatly improved. Migrating lamprey are concentrated in front of the river mouth before entering the river.

c) The main run takes place on the next day; if the river level lowers at the same time, catches of lamprey downstream will be high (the "climax").

d) Thus, the catch of one day depends on changes in the water level of the river on the two preceding days.

Duration of periods of catch fluctuations (the whole cycle is:- minimum, raise, peak, decline, minimum), depends closely on the cyclic of dynamics of the river level (Table 1 a & b).

Thus it is possible to set up a table for forecasting fluctuations of lamprey migrations and catches on the basis of analysis of fluctuations in the water level (Table 2).

As is seen from Table 2 the above-mentioned regularity proved to be correct in 70-75% correlation cases. Thus, these correlations may be used for calculation of forecasting lamprey catches.

Table 1. Duration of the lowering and raising of the water level (a) and catches (b) in the Gauya River in 1959-61 (% of all cases).

Duration in days		1	2	3	4	5	> 5
a	(Raise	46	30	12	8	3	1
	(Decline	42	24	17	10	3	4
b	(Raise	43	29	14	8	3	3
	(Decline	43	24	10	13	6	4

Table 2. Correlation between lamprey catches and the water level dynamics in the river (% of all cases of one catch per day).

		Water level in the river											
		The day before yesterday				Yesterday				Today			
		min.	raise	peak	de- cli- ne	min.	raise	peak	de- cli- ne	min-	raise	peak	de- cli- ne
Today	(Min.	26	20	16	38	33	24	17	26	35	24	32	9
	(Raise	45	32	13	10	19	39	35	7	3	29	32	36
Catch	(Peak	13	37	40	10	10	18	37	35	29	4	22	45
	(Decline	9	19	38	34	20	6	20	54	26	14	11	49

Fluctuations in the water level and wind regime are influencing the lamprey migrations and the catches downstream (the area of the main lamprey fishing) more than those of the phases of the moon; in many cases, the influence of the phases of the moon is equilibrated by that of the water level in the river. However, under favourable combinations of these two influencing factors (large fluctuations of the water level in the dark night periods), the lamprey catches are especially high. It is thus necessary to take both these influences into consideration.

3. Water level in the river and lamprey catches

The amount of lamprey run is not only affected by the character of water level changes, but also by the height level. If the water level downstream descends below a certain "critical" point, lamprey cease their run into the river (obviously, the quantity of freshwater flowing into the inshore zone is not sufficient for attraction and orientation of lamprey); such cases occurred frequently in 1959-61.

Summary

1. Lamprey run into the Latvian rivers is characterized by sharp, short period fluctuations of fish runs.

2. In 1959-61 reasons for these fluctuations were studied; the purpose of the investigations being to work out methods of the lamprey catches forecasting several days in advance.

3. There is a relation between the fluctuations of the lamprey migration and changes of the phases of the moon.

4. There is a close relation between the amount of lamprey run into the rivers, water level changes in a river and the wind regime.

5. There is a discussion on this correlation and a method of possible lamprey catch forecasting 1-2 days in advance is proposed.

6. For some Latvian rivers a certain "critical" water level downstream was determined. When decreasing under this "critical" point lamprey cease to run into the river in spite of any other favourable conditions.

References

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