



Growth of Invasive Pike-Perch (Sander Lucioperca) in the Tudakul Reservoir

Hakimova R.¹

¹ – Navoi State Pedagogical Institute, Uzbekistan

Sulaymonov Sh¹

¹ – Navoi State Pedagogical Institute, Uzbekistan

Yuldashov, M.²

² – Tashkent State Agrarian University, Uzbekistan

Kamilov, B.²

² – Tashkent State Agrarian University, Uzbekistan

ABSTRACT

The growth of the invasive pike-perch (*Sander lucioperca*), an important commercial fish in the Tudakul reservoir, was studied. A positive linear relationship ($v=0.7985*SL+14.819$; $r=0.69$) was revealed between scale sizes (v , eyepiece-micrometer units) and standard body length (SL, cm). The samples included fish with a total length of 17–64.2 cm, standard length 14.2 – 54.2 cm, body weight 38 – 2420 g at the age of 1–4 years. The dependence of the standard and total (TL, cm) body lengths could be characterized by the regression equation: $SL = 0,9181*TL - 1,7941$ ($r = 0,99$). Total body weight (W , g) is related to total and standard body length: $w = 0,00228*TL^3,3751$ ($r=0,93$) and $w = 0,0069*SL^3,186$ ($r=0,93$). The average growth rate of pike-perch: SL_1 -22.8 cm, SL_2 – 40.6 cm, SL_3 – 54.0 cm, SL_4 -63 cm.

Keywords:

Pike-perch, *Sander lucioperca*, growth, fish growth, Tudakul reservoir, Uzbekistan

Zander (*Sander lucioperca*) – representative of the perch family (Percidae) - a highly plastic species that lived in freshwater reservoirs of the temperate zone in the basins of the Black, Azov, Caspian, and Aral seas. In the Aral Sea basin, pike perch lived in the Aral itself and the lower reaches of the Syr Darya and Amu Darya (Berg, 1949; Atlas..., 2003). In the second half of the twentieth century, as large-scale irrigation construction and the creation of reservoirs and storage lakes for drainage water for the purpose of artificially forming commercial ichthyofauna, pike perch were introduced into the Zarafshan River basin, incl. to the Tudakul reservoir. The Ural River was chosen as the donor reservoir. Pike perch adapted to new conditions, began to reproduce, and became an important commercial fish (Kamilov, 1973; Yuldashov, Kamilov, 2018;). The biological features of pike perch in the Tudakul Reservoir were mainly studied in the 1960-1970s (Kamilov, Urchinov, 1995). For the rational use of commercial fish populations, the most

important thing is to assess the age and growth of individuals of a given population, which is also of interest for fisheries research (Kamilov et al., 2021). The purpose of this work was to assess the size and growth of pike perch in the Tudakul Reservoir at the present time.

The Tudakul reservoir is an important fishery reservoir of the republic, one of the few reservoirs in the lowland part of the republic. The area of the reservoir when filled is more than 22 thousand hectares, the average depth is more than 5 m, the maximum depth is more than 20 m. The reservoir was created for irrigation purposes in the lower reaches of the Zarafshan River (39°51'15"N; 64°50'26"E). The reservoir is located in an arid zone, the climate is sharply continental, the seasonality of the climate is clearly manifested: winter is relatively cold (the average monthly air temperature in January is about -2.5 °C), summer is hot (in the daytime the air temperature remains 35 - 40 °C for more than 1.5 months).

The material was collected in March in 2022-2023 in commercial and research catches in the Tudakul reservoir, in which fixed nets with a mesh of 18 - 60 mm were used. In fish, total (TL) and standard (SL) body lengths were measured with an accuracy of 0.1 cm, and total body weight (w) with an accuracy of 1 g. Scales were collected above the lateral line under the first rays of the dorsal fin. Using scale preparations, the age of the fish was determined, and the growth rate was reconstructed based on years of life using the method of E. Lea (Pravdin, 1966). The size of scales and annual rings (v) was measured using an eyepiece micrometer of an MBS-1 binocular.

The scales of pike perch are placoid. The annual growth zone on the scales consists of zones with widely spaced and closely spaced

sclerites (growth and wintering zones). A positive linear relationship was revealed between scale sizes (v, ocular micrometer units) and standard body length ($v = 0.7985 \cdot SL + 14.819$; $r = 0.69$).

The samples (110 specimens) included fish with a total length of 17–64.2 cm, a standard length of 14.2–54.2 cm, and a body weight of 38–2420 g at the age of 1–4 years.

The dependence of the standard and total body lengths of pike perch in the studied reservoir is reliably characterized by the regression equation: $SL = 0.9181 \cdot TL - 1.7941$ ($r = 0.99$). Total body weight is related to body length indicators by the following regression equations: $w = 0.00228 \cdot TL^{3.3751}$ ($r=0.93$) (Fig. 2) and $w = 0.0069 \cdot SL^{3.186}$ ($r=0.93$).

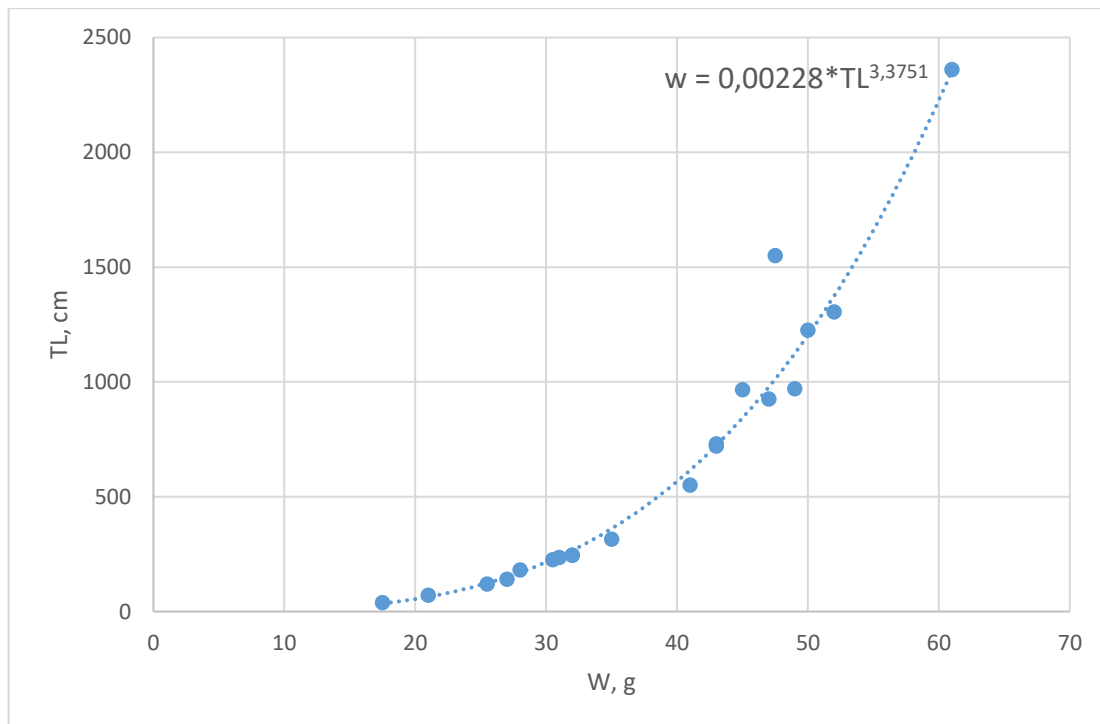


Fig. 1. Dependence of the total body weight of pike perch on the total body length, Tuda-Kul reservoir, 2022.

The restored growth rate of pike perch in the Tudakul reservoir by age group is presented in Table 1.

Table 1. Restored growth rate of pike perch in the Tudakul reservoir, 2022-2023.

Age, years	Standard body length, cm				N, copy.
	SL ₁	SL ₂	SL ₃	SL ₄	
1	23,8				48
2	22,0	40,9			50
3	20,1	38,4	54		10

4	20	37,2	63,7	63	2
average	22,8	40,6	54,0	63	
growth	22,8	17,8	13,4	9,0	

Discussion

During the period of large-scale irrigation construction in the Aral Sea basin, complete regulation of such rivers as the Kashkadarya, Zarafshan, Syrdarya and, to a large extent, the Amudarya took place. Many new lake-type reservoirs have appeared - reservoirs and lakes that store drainage water. At the same time, reservoirs are more confined to mountain and foothill zones; they have a sharply changing annual surface regime. The Tudakul reservoir is one of the few reservoirs built in the flat zone of the Aral Sea basin, which means that the water in them can warm up quite well in the summer. But it is in the summer that a significant part of the water from the reservoir is released to irrigate crops. The fauna of reservoirs is naturally formed due to the river fauna in the flood zone, which determines the low fish productivity of these newly created reservoirs (with the existing fishing culture - fishing with fixed nets by coastal crews - fish productivity can be 5-10 kg/ha. To increase fish productivity in reservoirs of Uzbekistan, methods of artificial formation of commercial ichthyofauna were used through reasonable acclimatization of promising commercial fish species. It is these fish that are currently the main ones in the Tudakul reservoir, including pike perch (Salikhov et al., 2001; Yuldashov, Kamilov, 2018).

Important goals of fisheries research include monitoring of invasive species, which provides valuable material on the adaptive ability of a species to new conditions. Growth is a general indicator that characterizes both the adaptive potential of a species in given conditions and all abiotic and biotic conditions. Due to this, much attention is paid to the study of the age and growth of fish from specific populations in ichthyology. (Kamilov et al., 2021).

Research has shown that pike perch in the Tudakul Reservoir is currently growing rapidly. In the 2020s, the herd is experiencing the pressure of fishing with fixed nets.

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Literature