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SHORT COMMUNICATIONS

Some Features of Biology of the Siberian Taimen *Hucho taimen* (Pallas, 1773) (Salmonidae) from the Tugur River Basin

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Abstract—Data on the size-age and sex structure, as well as the magnitude, of Siberian taimen *Hucho taimen* population from the Tugur River Basin are presented.

Keywords: Siberian taimen *Hucho taimen*, length, age, Tugur River Basin

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INTRODUCTION

At present, sport fishing is of considerable interest and there are great prospects for fishing tourism. This also applies to the northeastern region of Russia, where a number of attractive fish species live. This is especially the case for the Siberian taimen *Hucho taimen*. A sharp increase in the fishing load on the taimen population may adversely affect its abundance. Information on the biology and abundance of this species is necessary to avoid overfishing.

The fragmentary data on the biology of the Siberian taimen date from the middle of the last century and are based only on several field studies (Berg, 1948; Nikolskii, 1956). In addition to some data on the biology of the taimen from Selenga River on the territory of Mongolia, as well as the Lake Baikal Basin (Matveev et al., 1996), there is only brief information about taimen from other regions of Russia (Podlesnyi, 1958; Zolotukhin et al., 2000; Zadelenov, 2007; Zhuravlyov, 2012; Mikheev and Ogorodov, 2015). At present, information about the basic biological characteristics of these fish is very scarce, and there is no information on the biology of the Siberian taimen in the Tugur River Basin.

The Siberian taimen is an exclusively river fish, preferring rivers with a rapid current; and it never leaves to the sea. This fish inhabits in all the rivers of Siberia; the species is widespread up to the Indigirka River to the east and it is widespread to the Kama and Vyatka basins and from the middle course of the Volga River and the upper stream of the Ural River in the west. In the Amur River Basin, Siberian taimen is found everywhere, including the tributaries of the Sungari and Ussuri rivers, but mostly in mountain areas. It inhabits in the Tugur and Uda rivers; Siberian taimen is rare on Sakhalin and it is found only in the northwest in some rivers facing the mouth of the Amur River. It also occurs in lakes. It is a large fish reaching 80 kg (Berg, 1948; Nikolskii, 1956; Zolotukhin et al., 2000). Lindbergh and Dulkate (1929) noted that taimen with a weight of up to 95 kg was captured in the Uda River. Taimen becomes sexually mature at the age of 4+ after reaching a length of 40–50 cm. Sex ratio is close to 1 : 1. In the Amur River Basin, spawning occurs in May. For spawning, Siberian taimen usually goes from large rivers into shallow tributaries, where it spawns eggs on shingly soil. Before spawning, the taimen acquires a bright spawning dress: the back becomes brownish-velvety and the ventral and anal fins, as well as the lower side of the caudal peduncle, are orange–red. The fecundity of the taimen in the Amur varies between 10 316–33 343 (21 763 on average) eggs (Nikolskii, 1956).

In the present work, data on the size-age and sex structure of the taimen population of the Tugur River Basin, as well as the estimation of its abundance in different watercourses, are presented.

The Tugur River was formed as a result of the confluence of the Konin (189 km) and Assyni (110 km) rivers. Konin River flows along the Koninskaya lowland in a direction from the north to the south; after the confluence with Assyni, the riverbed turns, and the stream moves from the south to the north along the Tuguro-Nemilenskaya lowland (Fig. 1). From the confluence place of the Konin and Assyni rivers to the entrance in Asman Bay (Tugur Bay of the Sea of Okhotsk), the length of the Tugur River is 175 km. The area of its catchment area is equal to 11 900 km^2. Tugur River Basin is characterized by the presence of high mountain ranges. The climate in the basin is continental with sharp fluctuations in annual and daily temperature values. The proximity of the Sea of Okhotsk (60–100 km), access to which is not blocked

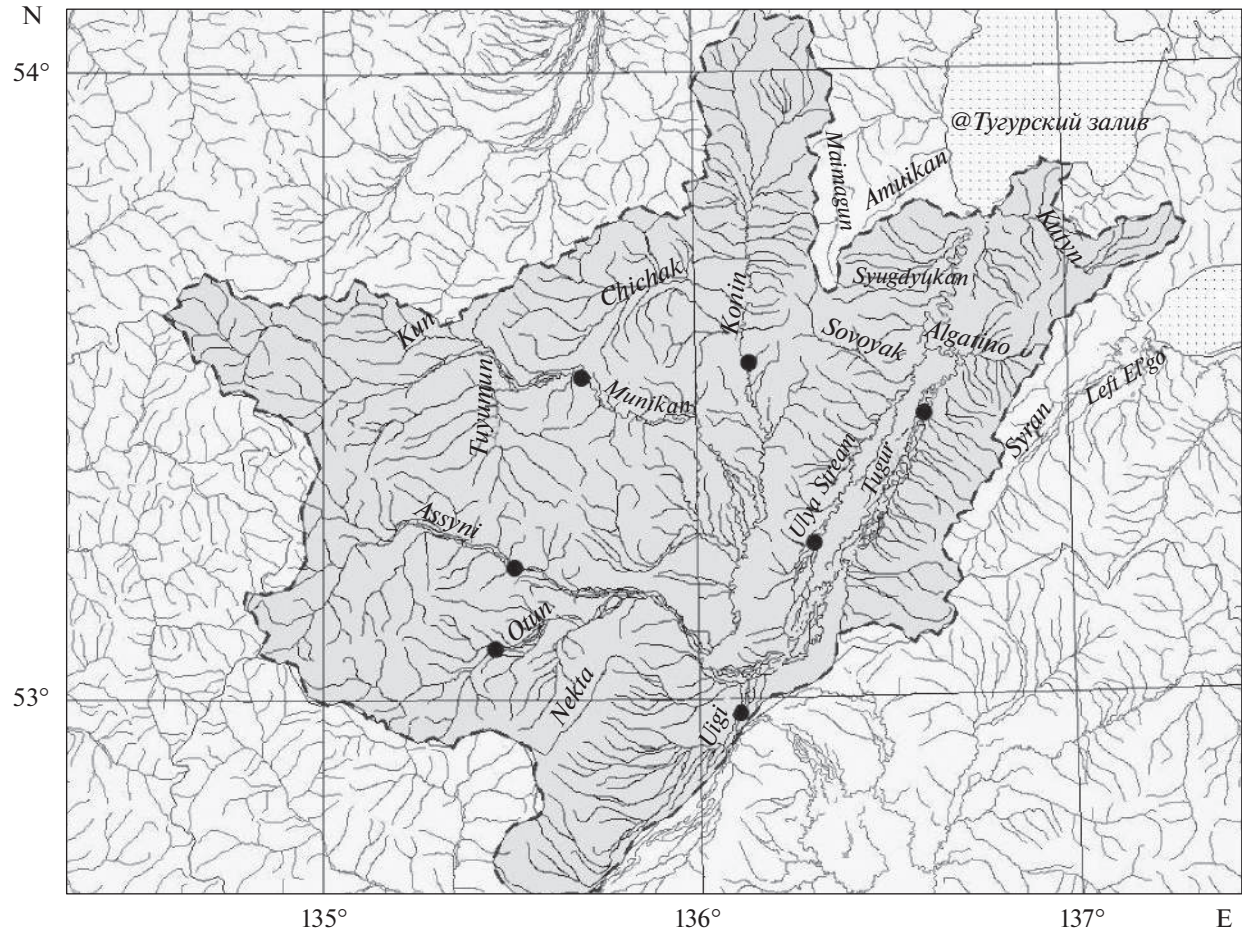

Fig. 1. Quick map of the research area: (●) place of collection of material, (- -) border of the Tugur River Basin.

by mountain ranges, causes a large amount of precipitation. In this regard, there are often strong floods here: spring floods due to the melting of snow, while those in summer and especially autumn are caused by prolonged rains (Yarmolyuk, 1957; *Encyclopedia*..., 1995).

The material was taken in the Tugur, Ulya, Uigi, Assyni, Otun, Konin, and Munikan rivers during the spawning and spawning period of chum salmon *Oncorhynchus keta*—from May to September 2007–2016 (Fig. 1). The fish were caught by a seine net with length of 100 m (mesh size is 30 mm). We subjected 82 individuals of taimen to biological analysis. Fish measurements were carried out according to the Pravdin diagram (1966); age was determined by vertebrae and scales.

In our catches, there were individuals with *FL* 10.2–163.0 cm, weight 11.4–40 800.0 g at the age of 1+–40+ (Table 1). Sex ratio is close to 1 : 1. The average weight of mature fish (*FL* > 70 cm) was 15.1 kg. In catches, commercial fish were 68.8% (Fig. 2a), while the portion of individuals aged 26+ and older was 10% (Fig. 2b).

In order to estimate the taimen reserve (Table 2), the catches of 100 settings of a net at 20 stations were analyzed (catching power of fishing gear was assumed to be one; the total length of the control areas was 8 km). When calculating the total area of biotopes suitable for feeding the Siberian taimen of commercial length, natural bars were not taken into account, since only young fish are fed on them.

Spawning of the taimen occurs at the end of May or beginning of June in the mountain and semimountain tributaries, where it is kept throughout the summer, and it moves into the channel of Tugur in the autumn for wintering. It does not breed annually. In the stomachs, in addition to living fish species, several individuals of spawning females of chum salmon (males were not found) were found as well as muskrat and ducks.

Table 1. Biological indices of the Siberian taimen *Hucho taimen* in the Tugur River Basin

Index	Both sexes	Males	Females
Length, cm:			
– Fork length (*FL*)	88.0 ± 4.35 10.2–163.0 (82)	99.1 ± 5.43 38.0–163.0 (37)	96.2 ± 5.22 42.0–154.0 (35)
– Standard length(*SL*)	74.8 ± 6.46 8.8–134.0 (26)	83.8 ± 6.88 36.0–120.0 (13)	82.8 ± 7.63 60.0–134.0 (9)
– Fish body	78.0 ± 12.78 27.0–760.0 (56)	93.9 ± 26.01 27.0–760.0(27)	65.3 ± 4.54 32.5–106.0 (26)
Weight, g:			
–Total	10700.4 ± 1308.35 11.4–40800.0 (72)	12585.3 ± 1938.50 464.0–35560.0 (32)	11283.9 ± 2034.82 700.0–40800.0 (32)
– Without guts	10225.0 ± 1645.35 428.0–32800.0 (31)	12327.4 ± 2295.24 428.0–26265.0 (13)	8706.7 ± 2284.42 640.0–32800.0 (18)
– Gonads	127.1 ± 35.33 0.5–625.0 (27)	178.2 ± 48.02 0.5–325.0 (10)	97.1 ± 48.03 1.0–625.0 (17)
Body girth, cm:			
– Greatest	54.2 ± 3.53 16.0–86.0(23)	52.9 ± 5.40 16.0–86.0 (13)	55.8 ± 4.34 37.0–78.0 (10)
– Smallest	19.5 ± 1.15 7.0–29.0(23)	19.1 ± 1.70 7.0–29.0 (13)	20.0 ± 1.54 14.0–29.0 (10)

* Above the line is the mean and standard error; under the line is the range of variation of the index; the number of fish examined is in parentheses.

Table 2. Estimated abundance of Siberian taimen *Hucho taimen* in the Tugur River Basin in 2016

River	River Course		Habitats		Density, ind/1000 m^2	Abundance, ind.
	length, km	mean width, m	distance, km	area, 1000 m^2		
Tugur	175	50	160	8000	0.30	2400
Ulya	60	20	30	500	0.05	25
Uigi	80	20	40	800	0.35	280
Assyni	110	30	50	1500	0.20	300
Otun	74	15	20	300	0	0
Konin	189	30	70	2100	0.20	420
Munikan	162	30	60	1800	0.35	630
Other tributaries	100	10	20	200	0.20	40
Total						4095

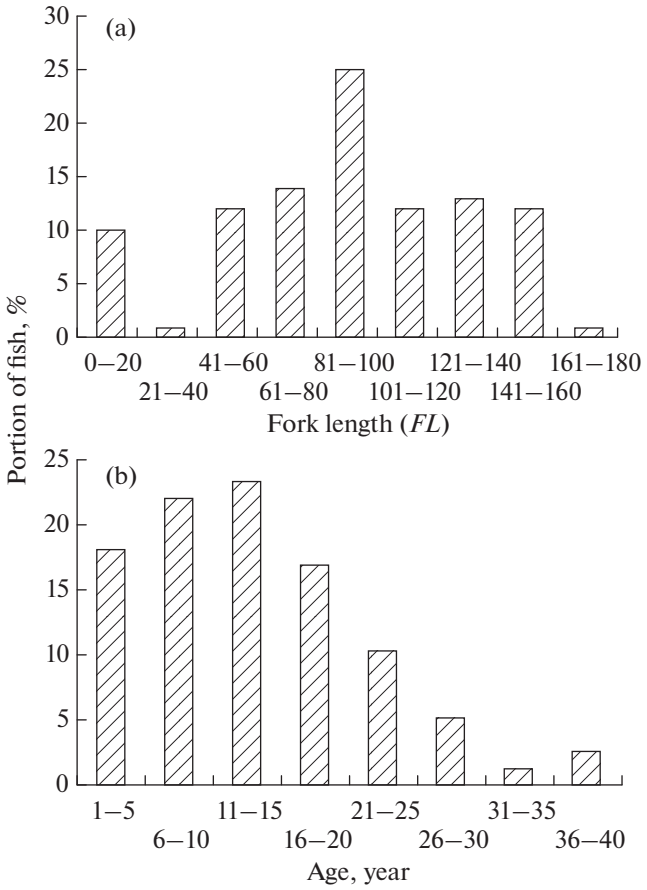

Fig. 2. (a) Dimensional and (b) age composition of the catches of the Siberian taimen *Hucho taimen* in the Tugur River Basin (82 ind.).

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