

SOME BIOLOGICAL AND MORPHOMETRIC CHARACTERISTICS OF A VENDACE (*COREGONUS ALBULA* L.) OF THE LAKE PARAVANI

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Abstract

Some morphometric characteristics, condition factor, age groups of vendace (*Coregonus albula* L.) of Paravani Lake (South Georgia) have been given for the first time since 1970. Growth rates in accordance with the age were compared using Fulton's condition factor. The study of annual growth was based on back-calculations of length. It was shown that nowadays in Paravani Lake quantity of vendace, as well as length and weight rate were diminished. The reasons of such changes are discussed.

Key words: Vendace (*Coregonus albula*), Paravani, Georgia

Introduction

Paravani Lake is the largest lake in Georgia, its surface in average is 37km². The maximum length is 10 km, the maximum width - 5.75km; an average depth is 1.87m, maximum depth - 2.80m. The lake is located at 2080m above sea level in the north-east of Akhalkalaki and belongs to Ninotsminda region. The distance from the regional centre is 25km [Baratch, 1964].

Vendace was introduced into the Paravani Lake during the twentieth century, from Volkhov fish hatchery. In a new condition (location) it adapted easily and since the early 1940 vendace has been the dominant species in the commercial catches. Vendace was the main species in the total catch from Paravani in 1947 (203.5 tones) and 1952 (119.25 tones). From 1952 the annual catch of vendace declined, but in 1957 it again restored, from 1989 the annual catches finally decreased, from 1994 till 2001 whole catch achieves 100 tones [Japoshvili, 2002. Japoshvili et al. 1999]. Initially this decline was caused by intensive fishery, unfavorable combinations of water condition and by other ecological factors.

Vendace in Lake Paravani grow rapidly, young fish usually attain length of 10-14 cm during the first year and 17-23 cm. during the second year. Females reach maturity in the fall of their second year.

Material and methods

Sampling was started from 1999 and continued in 2002. In winter when the lake is ice-covered, seines are operated below the ice through a series of hole, using ropes driven under the ice between holes with long, floating poles, with gillnets during the summer, and with trap nets in autumn. All fishes were sorted by species, age or size groups. Total length, weight and sex of each

individual were recorded [Pravdin, 1966] Age determinations were based on scales. The study of annual growth was based on back calculations of length [Lea, 1910];

$$\frac{L}{C} = \frac{L_x}{C_x}$$

where L - length of fish; C- distance from the scale to the edge, C_x - distance from the scale centre to each of the rings, L_x- length of X age fish. Back-calculations are used to estimate vendace length at previous ages. For this purpose using the scales removed from each individual fish, the distance from the scale centre to each of the rings and to the edge was measured. To estimate the condition of fish Fulton's formula was used:

$$K = \left(\frac{W}{TL^3} \right) \times 100$$

where K is condition factor, W-weight of fish, TL- total length of fish.

Results

Our research has shown that 0+, 1+, 2+, 3+ age groups are found mainly in Paravani Lake at present and three years old fishes prevail among them. Our study of vendace (*Coregonus albula* Linnaeus) was aimed primarily at determining the biology, diet variation with season and age. as well as growth rate, condition factor, morphometric characters of vendace.

Table 1. Some characteristics of vendace in the Lake Paravani.

Age	TL	length of fish without C	weight	Condition factor	By Demetrashvili (1960) data		
					TL	length without C	weight
0+	11.2	10.6	52		14	13.5	30
1+	23.2	19.7	84	7.2	24.8	23.9	173
2+	26	22.8	138	0.78	20	27.2	277
3+	28.3	25.2	161	0.83	32.9	31.7	487

From Table 1 the condition factor, length and weight of fish reach maximum in the fish of 3+ years age. By Demetrashvili's data length and weight of same age fish are higher then our results. Namely, if earlier an average weight of the fish was 250-350g, at present it decreased to 120-150g.

We measured morphometric characteristics of 2+ years age vendace and results are given in Table 2.

Table 2. Morphometric characteristics of 2+ age *Coregonus albula* L

Character	Female	Male
TL	25.86	24.66
SL	23.6	22.55
Snout length	1	0.9
Eye diameter	0.9	0.88
Postorbital distance	1.96	1.86
Head length	4	3.8
Head depth	2.9	2.77
Maximum body depth	4.26	4.1
Minimum body depth	1.39	1.34
Predorsal distance	9.2	8.72
Postdorsal distance	8.7	8.3
Caudal peduncle length	2.7	2.5
D length	2.12	2.1
D depth	3.55	3.5
P length	0.7	0.67
P depth	2.94	2.9
P-V distance	6.4	5.86
V-A distance	5.46	5.1
Number of rays in D	II-III 9-12	II-III 8-11
Number of rays in A	II-III 8-13	II-III 8-13

Abbreviations used are: TL- total length, SL- standard length. D- dorsal fin, P- pectoral fin, 4- anal fin, V- ventral fin.

Conclusions

We compared vendace growth rate in Paravani Lake to those of Russian and Finish lakes [Potopova, 1972; Sarvala et al. 1988; Sarvala et al. 1999; Helminen et al. 1992; Helminen et al. 1997], it was revealed that in Paravani Lake vendace growth rate is high and on the third year of life becomes the object of fishery.

The results have shown that nowadays in Paravani Lake quantity of vendace as well as length and weight rate are diminished. In our opinion it depends on ecological factors as much as on the government's lack of attention. There is much illegal fishing in Lake Paravi, everyday all age group vendace is caught in the lake. This all hinders the fish to have active feeding, and it causes decrease in the size of vendace.

Thus, vendace as ichthyofaunistic rare and economically important species must be regarded as greatly endangered species that requires special attention and protection.

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შარავნის ტბაში ბავრცელქუში ევროპული ჭაფალას
(*COREGONUS ALBULA L.*) ბიოლოგიური და მორფომეტრული
თავისებურებები

ჯაფოშვილი ბ.

საქართველოს მეცნიერებათა აკადემიის ზოოლოგიის ინსტიტუტი

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რეზიუმე

პირველად 1970 წლის შემდეგ მოცემულია ევროპული ჭაფალას (*Coregonus albula L.*) მორფომეტრული მახვენებლები, ნაკვებობის კოეფიციენტი. ასაკობრივი ჯგუფები. ფულტონის ნაკვებობის კოეფიციენტის გამოყენებით შედარებულია ზრდის ტემპი ასაკის მიხედვით. წლიური ზრდა შესწავლილია სივრცის უკუგამთვლის მეთოდის გამოყენებით. ნაჩვენებია, რომ ამჟამად შემცირებულია ევროპული ჭაფალას, როგორც რიცხოვნობა, ასევე სივრცე და წინა ასაკის მიხედვით ფარავნის ტბაში. განხილულია ამ ცვლილებების გამომწვევი მიზეზები.