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Original Research

Estimates of the Frequency Distribution (FTL%) for the Length-Classes Present in the Stocks of Ohrid Trout (*Salmo letnica*) and Belushka (*Salmo ohridanus*) from the Albanian Part of Lake Ohrid

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Abstract

Based on morphometric analyses of individuals sampled from commercial catches, the frequency distribution of length classes present in the stocks of Ohrid trout (Salmo letnica) and belushka (Salmo ohridanus) in the Albanian part of Lake Ohrid was assessed. No significant differences were found in mean total length (TL, cm) among the three spatial fractions of either stock ($P > 0.05$), suggesting the existence of a single stock for each species. The dominant length class in the Ohrid trout stock was 31.8–35.8 cm (F% = 44.39), whereas in the belushka stock the dominant length class was 30.1–33.0 cm (F% = 30.99). The length-frequency distributions of both species were monomodal. Polynomial relationships were identified between total length (TL, cm) and frequency of occurrence (F%). For Ohrid trout, the relationship was described by:

$F\% = -0.6724TL^3 + 7.2586TL^2 - 16.559TL + 10.847$ ($R^2 = 0.624$; $r = 0.790$),

whereas for belushka the relationship was:

$F\% = -0.3256TL^3 + 4.0984TL^2 - 11.486TL + 12.028$ ($R^2 = 0.697$; $r = 0.834$).

The results provide useful information for stock assessment, sustainable fisheries management, and conservation of these endemic salmonid species in Lake Ohrid.

Keywords. *Ohrid trout(Ohrid trout), Belushka, commercial fishing, stock, length-class frequency, monomodal (bimodal) distribution, endemic species, fishing/repopulation*.

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Introduction.

The Ohrid trout (Salmo letnica Karaman, 1924) and the belushka (Salmo ohridanus Steindachner, 1892) are two salmonid (Family Salmonidae), endemic to Lake Ohrid. According to published information, Ohrid trout reaches a maximum total length of 76.0 cm and a maximum body weight of 6.5 kg. The average total length at first maturity was estimated at 37.6 cm, with reported values ranging from 36.0 to 39.7 cm (FishBase, 2023). For belushka, the highest reported total length and body weight are 33.6 cm and 685 g, respectively (FishBase, 2023). The analysis of fish population structure based on body-size distribution is one of the most commonly used components in stock assessment studies. The size structure of a population reflects recruitment dynamics, growth characteristics, and fluctuations in total mortality (Neumann and Allen, 2007). Length-frequency data provide valuable information on fish population dynamics and may help identify problems such as temporal variability in cohort structure, slow growth, and excessive mortality (Anderson and Neumann, 1996; Neumann and Allen, 2007). In most cases, the interpretation of length-frequency data is complemented by other assessments, including catch-per-unit-effort analysis, age and growth studies, recruitment analysis, mortality estimates, and body condition assessments (Miranda and Bettoli, 2007).

In fisheries science, the study of body-size distribution has a long history and numerous practical applications (Froese et al., 2018). Theoretical concepts related to body-size distribution under different growth and mortality conditions were initially developed by Beverton and Holt (1957) and later incorporated into stock-assessment models based on length-frequency data, including those proposed by Hordyk et al. (2015a), Hordyk et al. (2015b), Froese et al. (2018), and Kokkalis et al. (2017). According to classical theory, the shape of body-size distributions depends largely on the relationship between growth and mortality rates.

Changes in body-size distribution result from the interaction of four major factors related to the characteristics of individuals within a population or cohort:

(1) initial size;

(2) the distribution of growth rates resulting from random differences of genetic or environmental nature between individuals and ages;

(3) the dependence of individual growth rates on size and time (age) resulting from the interaction of biological characteristics with the environment;

(4) mortality, which may differentially affect particular length-classes (Huston and DeAngelis, 1987).

In fish populations, length-frequency distributions may be monomodal (single peak) or bimodal (two peaks), reflecting differences in population structure and growth patterns. A monomodal distribution generally indicates the dominance of a single cohort or age group, whereas a bimodal distribution suggests the presence of two distinct size groups or age classes that may result from differences in growth rates and recruitment characteristics (Laslett et al., 2004).

Information on the demography of endemic salmonids from Lake Ohrid, particularly regarding length-frequency distributions, remains limited. Previous studies by Spirkovski (1991) and Jahollari (2014) have provided valuable information on Ohrid trout populations. Additional morphometric assessments of Ohrid trout and belushka have been reported by Filipi (1959), Petrova-Rečkoska (1993), Spirkovski and Ilic-Boeva (2004), Belichovska (2010), Palluqi and Spirkovski (2017), and Kolaneci and Bllaca (2024).By carrying out a stock assessment based on the analysis of the population structure of two endemic trouts in the Albanian part of Lake Ohrid, we aimed to indirectly reveal their real structure according to the size of individuals, while simultaneously demonstrating a model for assessing the responsible use and predicting the future of Ohrid trout and belushka stocks.

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Material and Methods

Study period and location: The study was conducted during 2025 in the Western and Southern areas of Lake Ohrid (Figure 1). The object of the study were the stocks of two endemic trout for this lake, the Ohrid trout (Salmo letnica) and the belushka (Salmo ohridanus). The fish sampling areas included three commercial fishing regions; the Lin region, the Piskupat-Udenisht region (Western shore of the lake) and the Pogradec-Tushemisht region (Southern shore of the lake).

Figure 1. (a) Three endemic trout fishing areas (shown with oval shapes) in the Albanian part of Lake Ohrid;(b) Belushka (S.ohridanus);(c) Ohrid trouti (S.letnica);(d) Imitation treble hooks used by professional fishermen for catching Ohrid trout and belushka.

Fish sampling: Fish sampling was carried out within the period when the capture of the two ichthyic species included in the study is allowed (MBZHR, 2022). Of the total number of individuals included in the samples (coran N=216; belushka N=242) the largest number was taken from commercial fisheries, which are allowed to exploit the coran after reaching a length of TL=32 cm and the belushka starting from a length of TL=30 cm (Palluqi and Spirkovski, 2017). A limited number of individuals were taken from test catches (carried out with "long-lines" hooks, like commercial catches), which have provided individuals with smaller sizes than those mentioned.

The inclusion of individuals in the samples for morphometric analyses was done without prior selection, i.e. randomly. Since the catches were carried out at night, the coran and The salmon were sampled and measured in the morning.Demographic assessments were made for both sexes taken together. The ichthyological analysis for demographic assessment was focused only on the measurement of total length or zoological length (TL, cm) (Figure 2). The measurement was performed by applying the scheme for morphometry of fish of the Salmonidae Family, according to Piria and Bashkaut. (2020).

Calculation of frequencies for the length-classes present:

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The values of the interval between consecutive length-classes were 4.0 cm for the Ohrid trout and 2.9 cm for the Belushka. The measured individuals were grouped according to the identified length-classes, determining at the end of the analysis of the total sample the number of individuals for each length-class. The frequency for each of the length-classes was calculated in the mean, applying the formula:

$$FTL\%=(n*100)/N$$

FTL%-frequency of the length-class;
n–number of individuals in a respective length-class;
N–total number of individuals in the next sample.

Figure 2. Measurement of total length (TL, cm) in an individual of the Ohrid trout (S. letnica).

The numerical data for n,N and FTL% were entered into a table and further processed to be presented in graphical form.

Mode of the frequency curve for the present length classes:
The discovery of the mode of the frequency-size distribution was carried out after regression and correlation analysis for the polynomial correlation ($y=-ax^3+bx^2-cx+d$) between the variables "length class (x)" and "frequency of presence" (y). According to Selvaraju (2021), the mode of the distribution is determined by the number of vertices in the curve resulting from the solution of the respective regression. In addition to the mode of the distribution, it was determined whether the frequency-length curve was symmetrical or asymmetrical. When the curve was asymmetrical, it was tested whether the asymmetry was caused by its "distortion" to the right or left of the imaginary line that intersects the X-axis, at that point that represents the average value calculated for the average total length. (TLM, cm), characteristic of the stock being analyzed (Selvaraju, 2021).

Results

Estimations for the stock of the Ohrid trout (Salmo letnica).

Estimation of the three fractions in the Ohrid trout stock according to the interval-length (TLmin-TLmax) and the average value of the total length (TLM): The numerical results set out in Table 1 as well as the differences in the height of the columns in the histogram of Figure 3 proved the existence of differences in the average values (M) of the total length (TL, cm) as well as in the values of the variance (Var%) between the three spatial

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fractions of the Ohrid trout stock, which were exploited by commercial fishing in the respective hunting areas.

Table 1. Average values, values of two biometric indicators and intervals (min-max) of values for total length (TL, cm) of the Ohrid trout (S. letnica) according to three spatial features of this species, in the Albanian part of Lake Ohrid.

Biometric indicator	Piskupat-Udenisht	Lin	Pogradec-Tushemisht
M (cm)	33.01	30.69	32.24
D	7.789	7.826	8.068
Var%	23.59	25.5	25.02
Min-Max (cm)	19.6-44.8	18.7-42.8	20.7-44.3

From the analysis of fish caught during 2025, it resulted that the average length of the Ohrid trouts fished in the Lin area was 2.32 cm smaller compared to the Ohrid trouts that were fished in the Piskupat-Udenisht area. The average length was 1.55 cm smaller when compared to the Ohrid trouts fished in the Pogradec-Tushemisht lake area. The total catch of Ohrid trouts in the Lin area, judged by the degree of variability of the size of individuals, was distinguished by the highest values of variability (Var%=25.50), compared to the catches made in the other two fishing regions (Var%=23.59 in the Piskupat-Udenisht area and 25.02% in the Pogradec-Voloreka area).

However, despite the real differences that manifested the average values of the parameter being evaluated, the differences between them, according to the one-way analysis of variance (ANOVA), in none of the three cases compared were significant ($t<0.25; P>0.05$). This assessment can be used as evidence to assert that the three spatial fractions of the Ohrid trout belong to a single stock. If further studies prove the stability of spatial changes for the average values of the parameter TL, cm, which were found in our study in the Ohrid trout stock, then it may be sought to discover the influencing factors.

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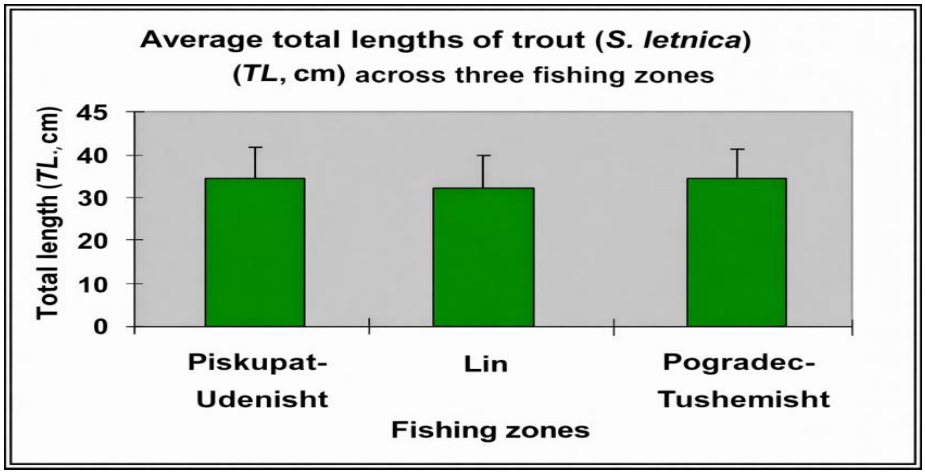
Figure 3. Average total length (TLM, cm) and standard deviation (SD) values for three spatial fractions in the stock of Ohrid trout (S. letnica), according to the analysis of samples taken from commercial harvests in 2025



Ohrid trout stock: The results from the measurement of the total length (TL, cm) in 214 Ohrid trout individuals, which made up the total sample, were grouped according to length-classes with an interval of 4.0 cm from each other (except for two extreme length classes in which individuals with TL<19.5 cm and individuals with TL>44.0 cm were included, respectively). Based on the respective number of individuals found for each length-class (n) and the number of individuals that made up the total sample (N), the frequency of presence (F%) was calculated for each length-class in percentage (Table 2).

The histogram in Figure 4 demonstrates the variability of the frequency values (F%) for the length-classes present in the stock of the Ohrid trout, which is concentrated in the Western and Southern areas of Lake Ohrid. It is important to clarify first that our results refer to the "stock" of this species, that is, that part of the population that is vulnerable to commercial fishing (or is catchable by the relevant fishing gear) and not to

The total length intervals, from the individual found with the lowest total length value to the individual found with the highest value of this morphometric indicator, reflected, to a certain extent, the distribution of the average total length values, according to the three spatial fractions in the Ohrid trout stock. In the order of values from TL=18.7 cm (the minimum identified value) to TL=44.8 cm (the maximum identified value), the fraction exploited in the Lin area belonged to both the lowest value on the left side (TL=18.7 cm) and the lowest value on the right side (TL=42.8 cm) of the respective order (or the increasing side of the TL values). In the Pogradec-Tushemisht fraction we found the highest value encountered at the minimum end of the order of TL values (TL=20.7 cm), while from the commercial records that were realized in the Piskupat-Udenisht fraction we measured the individual with the largest total length value (TL=44.8 cm).

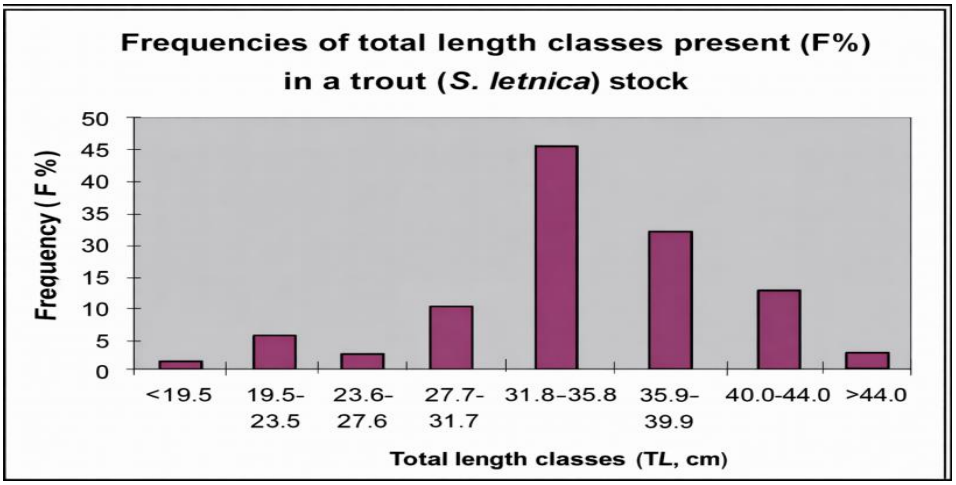
ii. Results from the frequency distribution analysis (F%) for the length-class (TL, cm) present in the

the "population" as a whole. Sampling based on the catch made with commercial fishing gear is a methodological requirement for "stock assessments", including demographic assessments.

Table 2. Basic data, from the analysis of samples taken from commercial catches, for the assessment of the frequency distribution for the length-classes present in the stock of the Ohrid trout (S. letnica).

Class-Length (TL,cm) [Interval 4.0 cm]	Number of individuals (n)	Frequency by number (F%)
<19.5	2	0.94
19.5-23.5	10	4.67
23.6-27.6	6	2.81
27.7-31.7	21	9.81
31.8-35.8	95	44.39
35.9-39.9	49	22.89
40.0-44.0	25	11.68
>44.0	6	2.81
Total	214	100

Figure 4. Presence frequencies (F%), calculated based on the number of individuals (n) per length-class (TL, cm) present in the stock of the Ohrid trout (S. letnica), according to the results of the analysis of commercial stocks.



Returning to the commentary on the figures listed in the F% column of Table 2 and the order of variability represented by the columns in the histogram in Figure 4, it resulted that 18.23% of

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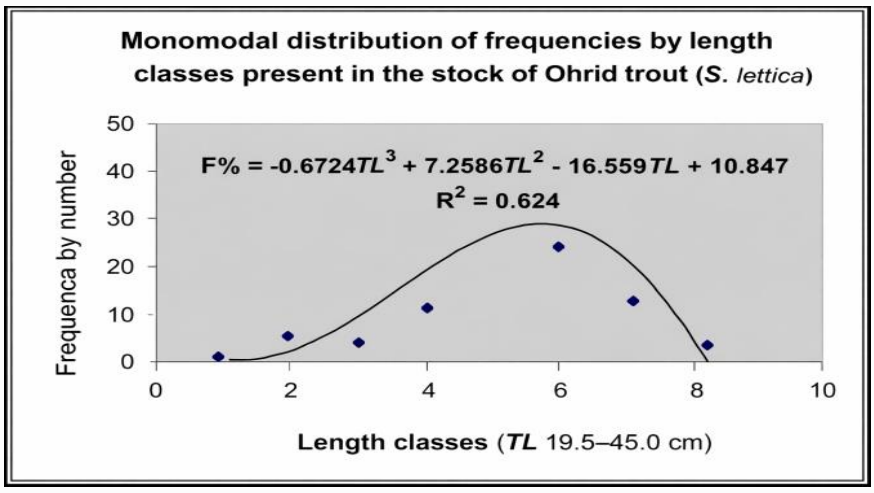
the individuals included in the catches had not reached the minimum size allowed for exploitation (MBZHR, 2022). In reality, this size (TL=32 cm) corresponds to the age at first maturity (3+), mainly of male individuals of this species (Rakaj and Flloko, 1996). In the measure of approximately 67.5%, the catch was dominated by length classes from 31.8 to 39.9 cm. Both of these length classes included females and males of the Ohrid trout that reached sexual maturity and entered the first increase (Filipi, 1959; Rakaj and Flloko, 1995). The "press" of the weighting or the peak of the order of The length-frequency, represented by the length class 31.8-35.8 cm (44.39% of the sampled individuals), mainly included individuals of the Ohrid trout that were included in the first catch (32 cm, according to the MABR, 2022). Individuals included in the length class of 40 cm and over (n=31 individuals and F%=14.49) were relatively rare in the Ohrid trout catches. However, we think that it may be a misconception to consider this conclusion as a feature of the respective stock. There is a high possibility that Ohrid trout individuals with a length of over 45-50 cm "avoid" the catch, as they can concentrate in the deeper levels of the lake's pelagic zone, and even in "shelters" present in the coastal areas, especially in the periods preceding spawning. The tendency of adults to live solitary lives greatly reduces the possibility of their capture by hunting tools, especially hooks.

Figure 5. Monomodal curve and corresponding regression equation (R^2=0.624;r=0.790) for the polyno mial correlation between the variables "length-class (TL,cm)" and "frequency of presence (F%)" for a stock of Ohrid trout (S.letnica) exploited by commercial fishing in the Albanian part of Lake Ohrid.



Regression and correlation analysis resulted in the identification of a polynomial correlation between the variable "class-length" and the variable "frequency of presence" (Figure 5). The coefficients calculated for the corresponding equation were as follows:

$F\% = -0.6724TL^3 + 7.2586TL^2 - 16.559TL + 10.847$

$R^2 = 0.624$; $r = 0.790$

This equation can be used as an empirical formula for estimates of the frequencies of presence of the corresponding length classes in the stock of the Ohrid trout, e.g. the frequencies of presence of individuals entering the first capture or those maturing for the first time, knowing in ad-

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vance the average values of TL, cm in the first capture as well as in the first maturation. In any case, it would be necessary to make the corresponding corrections, using for this purpose the calculated value of the correlation coefficient (r).

The above polynomial relationship corresponded to an asymmetric monomodal curve (Figure 5). The asymmetry of the curve was caused by its negative "skewness", as a consequence of the fact that the average value of the total length (TL=33.66 cm) in the Ohrid trouts included in the dominant length class (TL=31.8-35.8; F%=44.39) did not coincide with the imaginary central perpendicular line, the origin of which marked the average value of the total length, characteristic for the respective stock (TL=31.98 cm), but was deviated to the right side of this line (or in relation to the observer of the written material).

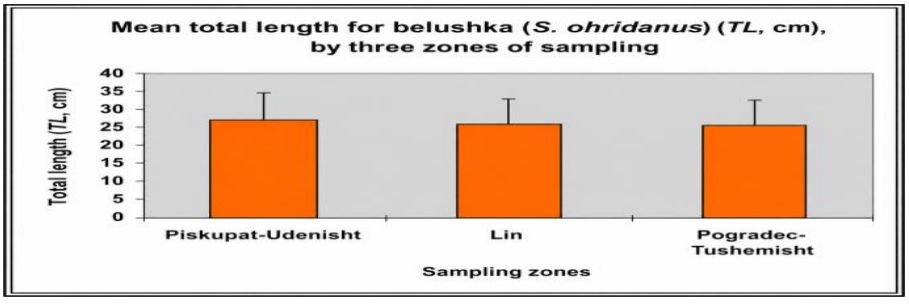
Estimations for the stock of the belushka (Salmo ohridanus).

*Evaluation of the three fractions in the belushka stock according to the length interval (TLmin-TLmax) and the average value of the total length (TLM):*The numerical data that we have placed in Table 3 as well as in the histogram of Figure 6 proved that the average values for the total length of belushka (TL, cm), which were fished during 2025 in three hunting areas, in the Albanian part of Lake Ohrid, had very small differences (from 0.23, when comparing the fraction of the stock that was exploited in the Lin area with the fraction exploited in the Pogradec-Tushemisht area, to 0.97 cm, when comparing the fraction of the stock exploited in the Piskupat-Udenisht area with the Pogradec-Tushemisht fraction).

*Table 3. Average values, values of two biometric indicators and intervals (min-max) of values for total length (TL, cm) of the belushka (S.ohridanus) according to the three spatial distributions of this species, in the Albanian part of Lake Ohrid***.**

Biometric indicator	Piskupat-Udenisht	Lin	Pogradec-Tushemisht
M (cm)	27.01	26.27	26.04
SD	6.631	6.480	6.398
Var%	24.55	24.67	24.57
Min-Max (cm)	15.4-36.5	15.1-36.8	14.9-36.3

Figure 6. Mean total length (TLM, cm) and standard deviation (SD) values for three spatial fractions in the stock of belushka (S.ohridanus), according to the analysis of samples taken from commercial stocks in 2025



Analysis of variance (ANOVA) for Student's t-test resulted in t-criterion values that were within the range of 0.03 to 0.12. Under such conditions, the significance of the differences between the mean total length values among the three spatial fractions in the stock of belushka was not proven. As we had found for Ohrid trout, this assessment proved that the belushkas that were exploited in the Western and Southern areas of Lake Ohrid also belonged to a single stock.

The interval of total length (TL, cm), from the individual with the smallest value, included in the analyzed samples of the belushka, to the individual with the largest value of this parameter, was 14.9 cm-36.8 cm.

The samples analyzed in the Piskupat-Udenisht area were distinguished by the smallest difference between the two extreme lengths (21.1 cm), while the samples analyzed in the Lin area were distinguished by the largest value of this difference (21.7 cm).

he belushka with the shortest height was measured in the Pogradec-Tushemisht area (TL=14.9 cm) while the belushka with the longest height was measured in the Lin area (TL=36.8 cm). Judging from the average values of variance (Var%) we can state that we did not find significant changes in the variability of the sizes of individuals between the species. of the Ohrid trout (Var%=24.70) and the belushka salmon (Var%=24.59).

Results from the analysis of the frequency distribution (F%) for the length-class (TL, cm) present in the belushka stock:

Table 4. Basic data, from the analysis of samples taken from commercial stocks, for the evaluation of the frequency distribution for the length-class present in the belushka stock (S.ohridanus).

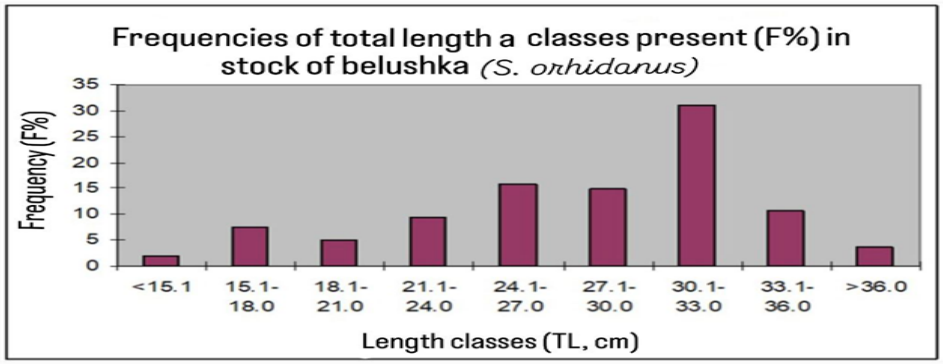
Class-Length (TL,cm) [Interval 2.9 cm]	Number of individuals (n)	Frequency (F%)
<15.1	5	2.07
15.1-18.0	18	7.45
18.1-21.0	12	4.95
21.1-24.0	23	9.5
24.1-27.0	38	15.7
27.1-30.0	36	14.88
30.1-33.0	75	30.99
33.1-36.0	26	10.74
>36.0	9	3.72
Total	N=242	100

The results of the estimation of the number of length classes (interval 2.9 cm; total 9 length classes) as well as the number of individuals (n) included in each of the length classes present in the total sample of sea urchins are shown in Table 4

Based on the values of n and the value of N (total number of sea urchins in the total sample), we calculated (in %) the values of the frequencies of

presence of each length class (F) in the estimated sample. The results of the calculations are shown in Table 4 and the diagram in Figure 7.

Figure 7. Frequencies of presence (F%), calculated based on the number of individuals (n) per length-class (TL, cm) present in the stock of belushka (S.ohridanus), according to the results of the analysis of commercial records



According to the evaluation of the belushka samples, it resulted that individuals of this species with a total length (TL) less than 15.1 cm constituted the length-class with the lowest frequency (F%=2.07) in the catches of this species. On the other hand, individuals of belushka included in the seventh length-class (30.1-33.0 cm) were distinguished by the highest value of the frequency of presence in the stock of this species. The frequency of presence of individuals included in the length interval from 30.0 cm to more than 36 cm, i.e. from the sixth length-class to the ninth length-class, was 53.31% (since in the length-class 27.1-30.0 cm the number of individuals that had a total length TL=30.0 cm was 19).

Based on the minimum value of the total length of the belushka, determined for the introduction of this species into exploitation (MARDZHR, 2022), it resulted that 46.69% of the belushka caught were undersized. The inclusion in the catch of individuals that are introduced in lengths from 17.0 cm to 24.0 cm (length classes II-IV) (approximately 18.60% of the total sample) damages the reproductive capacity of the stock, while, according to Filipi (1959), this size interval includes males and females that mature for the first time.

Figure 8. Monomodal curve and corresponding regression equation (R^2=0.697;r=0.834) for the polynomial correlation between the variables "length-class (TL,cm)" and "frequency of presence (F%)" for a stock of belushka (S.ohridanus) exploited by commercial fishing in the Albanian part of Lake Ohrid.

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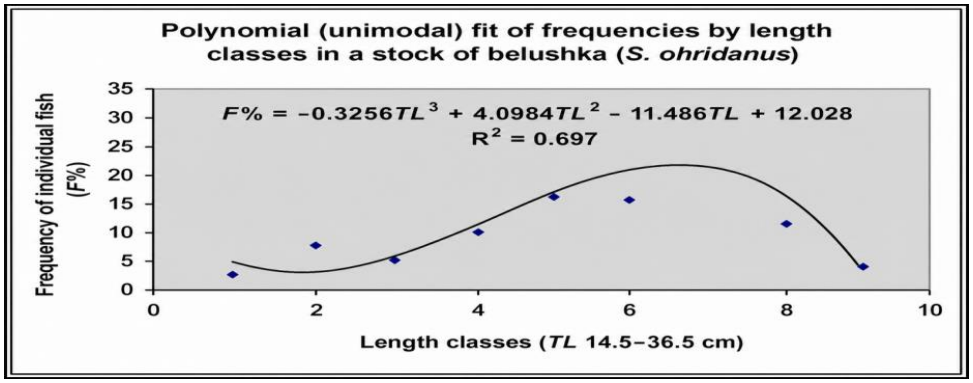

As for the Ohrid trout stock, for the belushka stock, the polynomial correlation between the variable "length class (TL, cm)" and the variable "frequency of presence (F%)" corresponded to an asymmetric monomodal curve, with negative "skew" (Figure 8). In this case, the average value of total length (TL=32.05 cm) for the belushkas that were included in the dominant length class (TLcm=30.1-33.0; F%=30.99) was clearly deviated to the right of that position on the X-axis where the average value of total length (TL=26.44 cm) is placed, characteristic of the stock being evaluated.

The calculated coefficients for the polynomial regression TL,cm (x)-F% (y), for the belushka stock, were:

$F\% = -0.3256TL^3 + 4.0984TL^2 - 11.486TL + 12.028$

$R^2 = 0.697$; $r = 0.834$

The use of the regression corresponding to the quality of the empirical equation, if for application purposes knowledge of the frequencies of presence for specific sizes of the belushka were required, would require taking into account the value of the parameter "r", in order to guarantee the real accuracy of the results.

Discussion

Analysis of the average total length (TL, cm) of Ohrid trout sampled from the three fishing areas showed slightly lower values in the Lin fraction compared with those from Piskupat-Udenisht and Pogradec-Tushemisht. However, the biometric analysis did not reveal statistically significant differences among the three fractions, suggesting that the sampled individuals belong to a single stock.The slightly smaller average length observed in the Lin area may be associated with local management practices, including the periodic release of hatchery-produced juveniles. Although the present study was not designed to evaluate the effects of stocking programs, artificial repopulation may influence local stock structure and deserves further investigation.

Regarding the frequency distribution of length classes in the Ohrid trout stock, our results were compared with previous assessments carried out by Spirkovski (1991) and Jahollari (2014). Despite differences in class intervals used by different authors, the results indicate several common features in the structure of commercial catches.Regarding the frequency distribution of length-classes present in the Ohrid trout stock, we compared our results with similar estimates previously carried out by Spirkovski (1991) and Jahollari (2014). Assuming an interval of 2.0 cm between consecutive length-classes, Spirkovski (1991) identified 20 length-classes, starting from the smallest total length (TL=19.0 cm) to the largest total length (TL=59.0 cm). The dominant length-class was found to be 35-37 cm (13.6%), while Ohrid trouts included in the length interval from 31 cm to 37 cm (three length-classes) constituted about 38.5% of the stock of this species. Undersized individuals (TL<32 cm), were in-

cluded in seven length classes, constituting approximately 19.5% of the stock. From such findings the author concluded that the Ohrid trout population in Lake Ohrid manifested a reduction in abundance as well as fitness disorders, in terms of self-recruitment.Jahollari (2014), accepting the interval of 2.9 cm between consecutive length-classes [except for the two extreme length-classes (TL<25.9 cm and TL>44.0 cm)], had identified in the samples of Ohrid trout taken from commercial catches the presence of eight length-classes. The dominant (F=26.06%) was the V-th length-class (35.0-37.9 cm) while Ohrid trouts that were included in the length-classes from 32.0 to 40.9 cm constituted 57.99% of the catch. Individuals included in the length-class TL>40 cm were represented in the catch with about 28% of it while individuals with sizes smaller than 32 cm were present with a frequency of 23.5%.

For some analogous estimates, we have compared our figures with those obtained by the two aforementioned authors.

These estimates include:

a. Sizes at first maturity:

According to our calculations, individuals of the Ohrid trout with sizes that were characteristic for the first maturity of males and females (31.8-39.9 cm) were present in the occupations of this species with a frequency of F=67.5%. According to the estimates of Spirkovski (1991) and Jahollari (2014), individuals of the indicated sizes were present in the occupations with the corresponding frequency values of F=57.5%. and F=55.5%.

b. Undersized specimens:

The specimens of individuals of the Ohrid trout with a length of TL<32.0 cm were encountered with a frequency of F=18.23% in our estimates, F=19.50% in the estimates of Sporkovski (1991) and 23.5% in the estimates of Jahollari (2014).

c. Dominant length-class.

Despite the differences in the value of the interval between consecutive length-classes (the interval, which for this comparison should be the same), we had identified as dominant in the Ohrid trout stock (F%=44.39) the length-class 31.8-35.8 cm. For Spirkovski (1991) the dominant (F%=13.60) was the length-class 35.0-37.0 while according to Jahollari (2014) the length-class 35.0-37.9 cm had the highest frequency of presence (F%=26.06). As noted above, the magnitude of the value of the parameter F% was affected by the width of the interval between consecutive length-classes.

d. Dimensions over 40 cm.

The percentage of Ohrid trout manuscripts with TL>40.0 cm was: 14.49%, according to our estimates, 28.5%, according to Spirkovski (1991) and 27.3% according to Jahollari (2014).

These estimates result in high figures for the inclusion in commercial fishing of individuals entering the first spawning season and quite low figures for the exploitation of individuals over 40 cm in length. Although the inclusion in fishing of a fraction of the Ohrid trout stock consisting of individuals with a length smaller than the allowed one was 2.5 to 3.7 times smaller compared to the inclusion of individuals spawning for the first time, their boarding and trading should be discontinued. Undersized Ohrid trouts should be considered by fishermen as “by catch” and, as such, should be returned unharmed to the lake immediately after capture. Similarly, fishing techniques should be controlled and improved (e.g. by applying lines with “imitating” hooks associated with accessories that guarantee their immersion in the depths of desired) in order to increase the frequency of capture for individuals with high values of total length, which populate deeper areas of the lake.

Regarding the stock of the belushka (S. ohridanus), we were unable to find estimates of the distribution of length classes, which would allow comparisons with our data. Some information on the change in the sizes of this species, in time and

space, is found in the analyses of catches. According to Spirkovski (1991), in the catches of the belushka, carried out with static traps, individuals with a length greater than 30.0 cm are rare. According to Stefanovic (1948), the belushka reaches an average length of 28.5 cm and an average weight of 171 g in the ninth year (8+), while the highest annual growth rate was experienced during the fourth year (3+) of life. According to estimates made by Belichovska (2010), the average length and weight of the belushka depended on the sampling areas and status. physiological. According to the areas of the lake where the samples were taken, the average total length in the interval between two consecutive increases varied from 21.74 cm to 22.19 cm and in the reproduction period, from 22.04 cm to 22.50 cm. Analyzing the catches of the belushka according to the total length of the individuals at the respective ages, Filipi (1959) had found the figure TL=14.0 cm as the smallest value and the figure TL=32.5 cm as the largest value for this morphometric parameter. According to our estimates, the average value of the total length of the belushka, according to the analysis of the samples taken from the commercial catches, was 26.44 cm, while the range of values for the total length was from 14.9 cm to 36.8 cm.

It is very likely that the differences for two estimated indicators (average total length and maximum identified length), between our data and the figures published by other authors, have their source in fishing practices and in particular in fishing gear. The use of hooks for fishing, compared to the use of nets (slings and single-line traps as well as the trammel net) increases the frequency of catching large individuals, extending the length-class range.

Conclusion.

By analyzing the frequencies of length-classes present in the commercial catches of Ohrid trout (S. letnica) and belushka (S. ohridanus), we aimed to apply a solution for discovering the demographic structure of the stocks of these two endemic trouts for Lake Ohrid. From this analysis, data were obtained on the frequency of exploitation of individuals entering the first increase, individuals that were distinguished by smaller sizes compared to the minimum size allowed for exploitation, as well as the length-class that resulted more exploited than the others. Being aware of the shortcomings, mainly related to the time limitation of the assessments, we hope to have provided additional elements in the system of interpretation of data on catches, so that fisheries management can guarantee the conservation of Ohrid trout and belushka stocks.

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