



**RATIO OF DIGESTIVE TRACT LENGTH AND STANDARD BODY LENGTH  
(*LEUCISCUS CEPHALUS ALBUS*, CYPRINIDAE)**

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**SYNOPSIS**

Analyses of the relative digestive tract length of the *Leuciscus cephalus albus*, included 106 analyzed samples divided into five length groups. Amplitude of length groups, juvenile and adult forms of the analysed fish goes from 60 to 360 mm.

Digestive tract of white chub, as well as of many cyprinid kinds of fish, has very simple form. It varies in relation to relative length and mass, and it depends on belonging to a certain age group.

According to results of research, in the younger growth classes, with the increase of body length, relative intestinal tract length increased. In the oldest established growth class, ratio of the body length and the length of the intestinal tract, is more or less stabilised.

The average value of the relative intestinal tract length of all analysed samples, show that the examined subspecies belongs to zoophytophagus group, where the participation of the vegetable component in the nutrition is not very present.

**MATERIAL AND METHODS**

Samples were collected on the following localities of Skadar Lake: near to Vranjina Island, tributary Virštica, locality near to Lesendro Island, area of Vučko Blato, locality Ploče and Kamenik. Analyses of the relative tract length of the *Leuciscus cephalus albus* included 106 analysed individuals, males and females, divided into five length groups, from 60 to 360 mm. For establishing the character of the connection of two variables, coefficient correlations was used:

$$r = \frac{N \sum_{xy} - (\sum_x)(\sum_y)}{\sqrt{[N \sum x^2 - (\sum x)^2][N \sum y^2 - (\sum y)^2]}}$$

Formula for calculating (r) is :

$\sum_{xy}$  - sum of multiplying of certain pairs results ;

N - number of pairs ;

$\sum x^2$  and  $\sum y^2$  - sum of square results of variable x and variable

### INTRODUCTION

Morphology of digestive tract of white chub, as well as of many cyprinid kinds of fish, has very simple form. In the total intestinal mass there are two curves of intestinal tract. White chub intestine is of middle stoutness, and it is not very elastic. It varies in relation to relative length and mass, and it depends on belonging to a certain age group (Krivokapic, 1999).

### RESULTS AND DISCUSSION

The average value of the digestive tract length has the lowest value with youngest individuals (0+) of the average value of the digestive tract length, expressed in percentages from the standard body length, also shows the highest value in the first group. The same fact was established for the endemic subspecies *Leuciscus souffia montenegrinus*, too, (Krivokapic, 1992.) from the Moraca river.

In the next two groups certain increase of average digestive tract length is noted, and that is 169.11 mm for the individuals of the second length class, age 1+ , and 235.95 mm, for the individuals of the third length groups, class age 2+ . However percentage values of the second and third (114.75 %), as well as, of the following two length groups, the fourth (107.44 %) and the fifth (105.23 %), of the length class show decrease, instead of expected increase. Data show, that the changes of the analysed values, established in the older length classes, are not regular.

Table 1a- Ratio of the digestive tract length and standard body length

●	○	■	□	◻	❖
60.1-120.0	52	86.58	107.03	123.91	0.7232
120.1-180.0	9	147.57	169.11	114.75	0.9578
180.1-240.0	20	207.32	235.95	114.04	0.3347
240.1-300.0	17	271.43	291.47	107.44	0.8747
300.1-360.0	8	323.85	340.75	105.23	0.5207
					0.9829

Legend:

- - length classes (mm)
- - number of samples
- - the average value of the standard body length
- - the average value of the digestive tract length (mm)
- ▣ - the average value of the digestive tract length (mm in percentages of standard length
- ❖ - correlation

According to the results of researches, it can be concluded that in the younger growth classes, with the increase of body length, relative intestinal tract length is increased, too, what is manifested by the average value of correlation ( $r=0.98$ ), with the exception of the older, that is, of the oldest established growth class, in which the ratio of the body length and the length of the intestinal tract, is more or less stabilized. Similar data were given by Vukovic, 1985. Author supposed that the noted occurrences was related to the changes in the nutrition content, during the ontogenetic development of the fish, that is, with the increase of body dimensions.

The average value of the relative intestinal tract length of all the analysed samples of 113.74 %. show that the examined subspecies belongs to zoophytophagus group, in which the participation of the vegetable component in the nutrition is not very present.

For the chub from the river Turija (*Leuciscus cephalus macedonicus*), the ratio between the length of intestinal tract and body length (Ivlev&Džineva, 1974.; Džineva, 1976), according to the obtained results, put the chub in the zoophytophagus group.

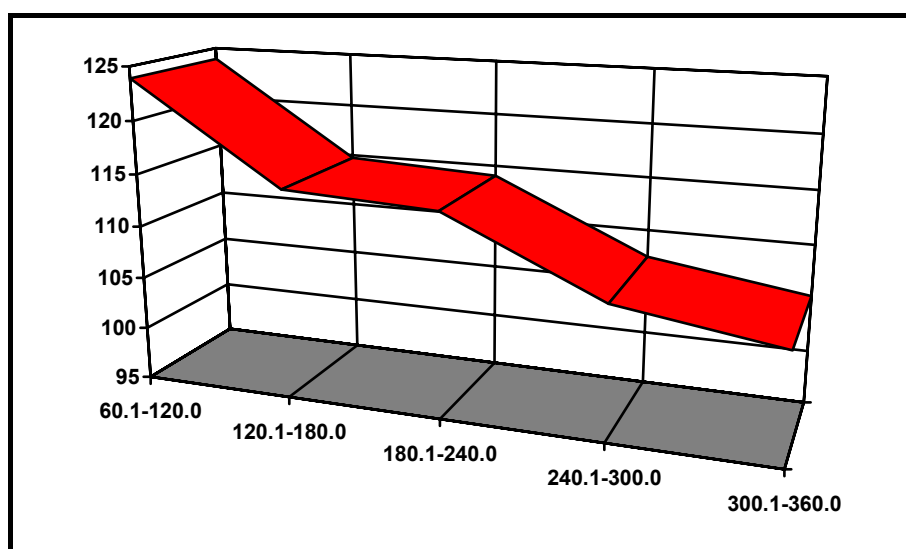


Fig. 1 A - Ratio of the digestive tract length and standard body length

General accepted is that zoophagus fish, when compared phytophagus fish, have shorter intestinal tract so, according to the length of intestinal tract, too,

conclusions on the nutrition of the certain species can be made (Maric,1998, Nikoljskij,1974),.

### CONCLUSIONS

Certain increase of average digestive tract length is noted (169.11 mm), for the individuals of the second length class, age 1+ , and 235.95 mm, for the individuals of the third length groups, length class 2+.Percentage values of the second and third (114.75 %), as well as, of the following two length groups, the fourth (107.44 % ) and the fifth (105.23 %), of the length class 3+ to 5+, show decrease, instead of expected increase. Data show, that the changes of the analysed values, established in the older length classes, are not regular. The ratio of the body length and the length of the intestinal tract, of the oldest established growth classes, is more or less stabilized.

The average value of the relative intestinal tract length of all analysed samples, show that the examined subspecies belongs to omnivore group (zoophytophagus group), with a great percentage of animal consumption when compared to vegetative component.

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