

Original Article

Particularities of Dentition in Some Rare Salmonid Species: Danube Salmon (*Hucho hucho*) and Black Sea Trout (*Salmo trutta labrax*)

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Abstract

The purpose of this paper was to morpho-anatomically study the dentition of the Danube salmon (*Hucho hucho*) and Black Sea trout (*Salmo trutta labrax*) and its topographical distribution in the oral cavity. On the mandible there are between 40 and 50 teeth, with an average of 46 teeth. There are 9 to 16 teeth on the tongue, with an average of 12.6. In the dorsal part of the mouth, on the outside of the upper jaw their number is between 65 and 72 teeth, with an average of 69.6 teeth. On the medial line of the upper jaw, there are between 37 and 46, with an average of 40.1 teeth. The Black Sea trout have teeth similar in shape, conical and sharpened at the tip. The teeth are prehensile, oriented aborally, on all segments of the mouth, less on the withers, where the alternating sides are oriented medio-laterally. There are 28 teeth on the jaw and 10 teeth on the surface of the tongue. In the upper part of the mouth there are 33 teeth on the upper jaw line, 33 teeth on the upper jaw line 24, and 13 teeth on the vertebra, the total number being of 108 teeth. Morphological characters, mood and teeth orientation clearly reflect the predatory character of salmonids. Of the two studied species, the largest number of teeth is found in Danube salmon, in terms of total number, and each segment of the oral cavity. In Danube salmon we also find that it has no teeth on the vomer, compared to Black Sea trout species, where we emphasize the presence of teeth.

Keywords: Danube salmon, Black Sea trout, dentition, morphology, anatomic topography.

1. Introduction

Depending on the nature of the food and its availability, morphological and behavioral adaptations have been outlined for the fish. Fish behavior is closely related to the type of dentition they hold [2]. The importance of studying fish dentition results from the fact that it can contribute more or less directly to the study of other aspects of fish life, such as eating behavior [13].

Knowing the particularities of dentition [4] can explain the different types of food behavior [5], especially that of raptors [10]. The number of teeth changes with the weight gain of the fish and is relatively constant when they reach a certain length of body [6].

Dentition is represented by oro-aboral and latero-medial ascitic formations, with a role in the retention of prey [8]. During the juvenile period, the teeth are in the form of sharp needles, and as they age they have a conical shape [1].

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2. Material and Method

In the study, 7 samples of loss of body weight between 221-263 g, aged 2 years and 6 months, coming from the Bistrișorii Valley trout, Alba County, were used. These specimens were later used in other morpho-histological research, trying to minimize as much as possible the number of sacrificed specimens.

In order to be able to highlight and count the teeth as best as possible, the heads of the specimens were dried at the oven for 4 hours at a temperature of 60 ° C. In the case of sea trout, only one specimen captured in the Romanian Black Sea coastal waters at the mouth of the Danube (Sf. Gheorghe, Tulcea County) was used. The studied specimens were dried in the oven, thus their dentition was more pronounced after dehydration of the tissues. Preparation of the

samples for oven drying was done by detaching the anterior part of the body or head, washing it with excess mucus and removing the gills. The heads thus prepared were placed at the oven at 60 ° C. Tooth counting was performed on the basis of executed photographs, because in some cases the teeth were too close to each other and there was a risk that the count would not be accurate. The photos were taken with the camera (Nikon D90, Nikon Coolpix P530) and processed with Adobe CS5 Photoshop.

3. Results and Discussions

In the studied specimens, the teeth were sharpened and well placed in the mandibular branch. Dentition in these species is very well developed, prehensile, characteristic of raptors. Lostrîța the presence of the teeth both on the jaw (Figure 1 C), the tongue on the outer jaw line and on the medial line of the upper jaw (Figure 1B). In the early stage of growth at *Hucho perryi*, the teeth on the tongue are disposed on two marginal rows [6] as evidenced in Fig. 1-C. It is also worth noting that in the case of the lost losses missing the teeth rows on the midline of the ceiling of the oral cavity (vomer). This situation occurs in salmonidae of the genus *Salvelinus*, other genera (*Salmo*, *Oncorhynchus*) presenting a medial-lateral dentition at this level.

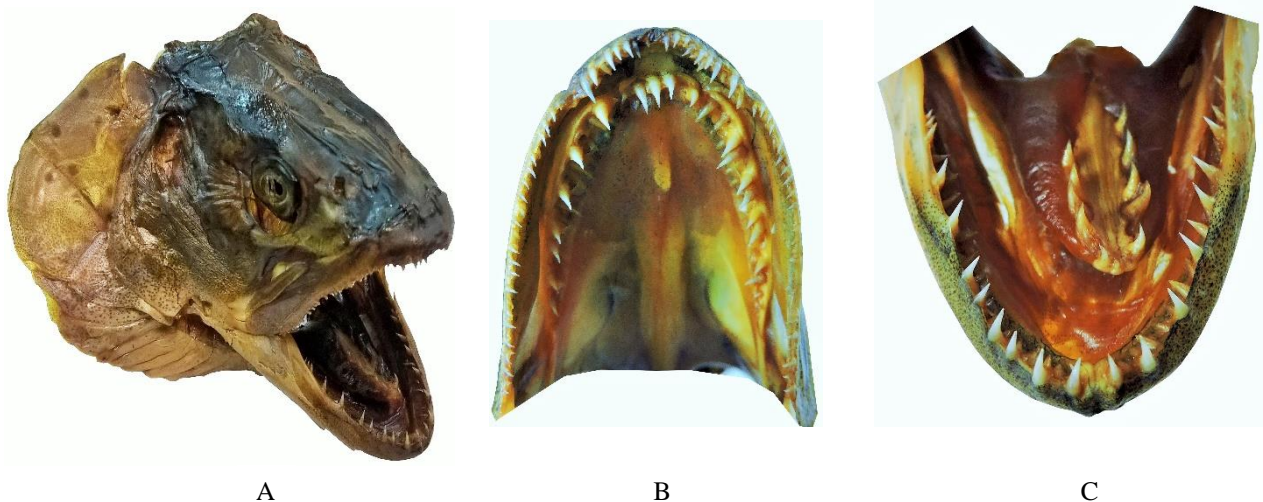


Figure 1. Anatomic segments in Danube salmon
A - head, B - mandible, C - upper jaw

The number of teeth at loss is greater than indigenous trout, rainbow, or fountain [3]. Table 1 shows the number of them for each segment studied. Lostrîța presents on the mandible a number of teeth between 40 and 50, with an average of 46 teeth. There are 9 to 16 teeth on the tongue, the average being 12.6. In the dorsal part of the mouth there are a number of teeth between 65 and 72 on the outside of

the upper jaw, their average on this segment being 69.6 teeth.

The last part of the mouth where we notice the presence of teeth is the median line of the upper jaw, here their number is between 37 and 46, having an average of 40.1 teeth. With regard to the total number of teeth each specimen of the lost, as well as the average number of teeth of the species, which is 168.

Table 1. The number of teeth identified in Danube salmon, by each studied segment

S	M	T	EUJ	MUJ	V	TN
1	46	16	72	37	-	171
2	49	9	73	38	-	169
3	44	12	68	42	-	166
4	49	16	68	38	-	171
5	50	14	71	41	-	176
6	40	11	70	39	-	160
7	44	10	65	46	-	165
X	46	12.6	69.6	40.1	-	168

S-Specimen, M-mandible, T-tongue, EUJ-external line of upper jaw, MUJ-Medial line of upper jaw, V-vomer, TN- Total number

In Fig. 2, the anatomical segments on which the teeth are placed in the case of the trout, respectively on the outer line of the upper jaw, the upper jaw median line (Fig.1C), the tongue and the mandible (Fig. 1 B).

It has a developed dentition, the teeth are of similar shape, conical and sharpened at the top. The teeth are oriented aborally, on all segments of the mouth, less on the wearer where alternately disposed, are medio-lateral oriented.

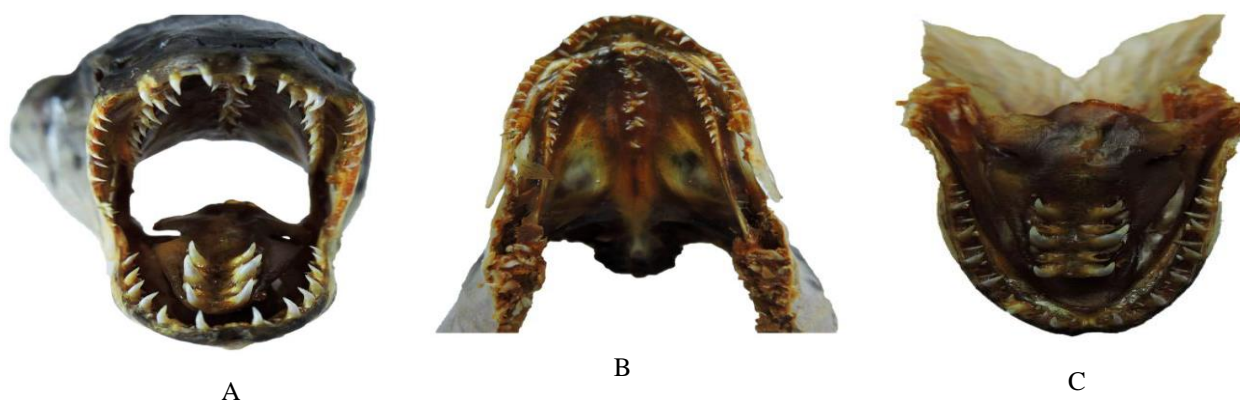


Figure 2. Anatomic segments in Black Sea trout
A – head of Black Sea salmon, B - mandible, C – upper jaw

According to Table 2, on the jaw one may find 28 teeth, while on the surface of the tongue there are 10 teeth. On the superior part of the mouth, located on the external part of the superior jaw, there are 33

teeth, on the median line of the superior jaw there are 24 and on the vomer a total of 13 teeth were emphasized. The total number of teeth identified in Black Sea salmon is of 108

Table 2. The distribution of teeth function of anatomic segments

S	M	T	EUJ	MUJ	V	TN
1	28	10	33	24	13	108

S-Specimen, M-mandible, T-tongue, EUJ-external line of upper jaw, MUJ-Medial line of upper jaw, V-vomer, TN- Total number

4. Conclusions

Salmonid dentition correlates with eating behavior, which can be used to improve the growth conditions of these species. Morphological

characters, mood and teeth orientation clearly reflect the predatory nature of salmonids.

The teeth of the species described in this paper are tapered, very sharp, and are oriented aboral

except for the teeth on the weevil in Back Sea trout, where they are medio-lateral oriented.

Concerning both studied species, we found that largest number of teeth in Danube salmon, expressed as both, the total number and in each segment of the oral cavity, compared to the Back Sea trout. We may also emphasize the lack of teeth on the vomer, in Danube salmon studied specimens.

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