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Some Population Parameters of *Capoeta capoeta umbla* (Heckel, 1843), Living in Tuzla Stream of Karasu River

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ABSTRACT: Length - weight relationship of *Capoeta capoeta umbla* which is an indigenous species in Tuzla stream, an important branch of Karasu River was determined as $W= 2.8.L^{2.2}$. Age changed from 1 to 6 in the population. 40.68 % of the population was female and 59.32 % of it was male. Average condition factor (K) was determined as 1.169. Most of the males reached to their maturation periods in age 3, whereas females were reaching in age 4 in the population. Average meat yields were attained as 64.37 % for males and 65.43 % for females.

Key Words: Tuzla Stream, *Capoeta capoeta umbla*, Siraz fish

Karasu Nehrinin Tuzla Çayı'nda Yaşayan *Capoeta capoeta umbla*'nın (Heckel, 1843), +Bazı Populasyon Parametreleri

ÖZET: Karasu'yun önemli kollarından Tuzla çayı'nda tabii olarak yaşayan *Capoeta capoeta umbla* (Heckel, 1843)'nın boy-ağırlık ilişkisi $W= 2,8.L^{2,2}$ olarak tespit edilmiştir. Populasyonda yaş grupları 1 - 6 arasında değişim göstermiştir. Bireylerin % 40,68'ini dişiler, % 59,32'sini ise erkekler oluşturmuştur. Ortalama kondüsyon faktörü 1,169 olarak tespit edilmiştir. Populasyonda erkek balıkların çoğunun 3. yaşta, dişi balıkların ise 4. yaşta cinsi olgunluğa eriştikleri tespit edilmiştir. Ortalama et verimleri erkeklerde % 64,37, dişilerde ise % 65,43 olarak bulunmuştur.

Anahtar Kelimeler: Tuzla Çayı, *Capoeta capoeta umbla*, Siraz

INTRODUCTION

Capoeta spp. belongs to Cyprinidae family and are called as "black - fish or Siraz fish " in Turkish. There have been a lot of researches done by some researchers on the *Capoeta capoeta umbla* which is living abundantly in some areas of Turkey (Slastenenko, 1955; Kuru, 1971; Geldiay and Balık, 1977; Özdemir, 1982; Özdemir, 1984; Yanar, 1984; Şen, 1988; Erk'akan and Akgül, 1986; Başusta and Erdem, 1995; Bircan and Polat, 1995). However, there were no data available on the biological properties of *Capoeta capoeta umbla* subspecies living in Tuzla stream. Therefore, we found worth to carry out this investigation.

MATERIAL AND METHODS

Tuzla stream originated from Çat mountains in Erzurum comes to northeast (10 km - research area) and there goes near to Mercan, (a province in Erzincan) and flows into Karasu river under Kötür bridge. It has 110 km length (Anonymous, 1995).

Total 118 fish were examined to determine some biological properties of *Capoeta capoeta umbla* from Tuzla stream generated in Erzurum. Fish samples were collected by using a cast net and a gill net in summer months. Each fish was measured (fork length, cm), weighed (g), and its scales were used for age determination (Atay, 1989; Hoşsucu, 1991; Çelikkale et. al., 1993; Erkoyuncu, 1995).

The scales removed for age grouping were kept for 2 - 2.5 hours in small petri dishes with 4 % NaOH. Then, scales were kept in distilled water for 15 -20 min. After that scales were placed in 96% alcohol for 10 - 15 minutes. Six or seven scales were arranged on a slide followed by application of glue on the edges and covered by using a second slide. After that the age of each fish was determined by enumerating the age lines on the scale by using method (Chugunova, 1963). Sex determination was made by the method used (Nikolsky, 1963). Length - weight relationships were computed for females, males and both by the same method used (Ricker, 1973; Ricker, 1975). Length - weight relationship was determined by using following equation:

$$\text{Log}W_t = a + b \,.\, \text{log}L_t$$

Where *Wt* is the weight at time t, and a and b are the coefficients of the logarithmic regression between $\text{log}W_t$ and $\text{log}L_t$ (Ricker, 1973). The Fulton's condition factor was calculated for each sex as follows :

$$K = (W_t / L_t^3)x100$$

Absolute and relative growth rates were calculated with the formulas given by (Ricker, 1979).

$$\text{Absolute growth rate} = (y_2 - y_1)/(t_2 - t_1)$$

$$\text{Relative growth rate} = [(y_2 - y_1)/(y_1.(t_2 - t_1)].100$$

Where y_1 and y_2 are the respective fish sizes and fish lengths at the time t_1 and t_2. Meat yield rate was calculated as a proportion of the fishes' whole weight (Erkoyuncu and Samsun, 1988; Karaçam and Düzgüneş, 1990). Statistical analyses were done where necessary by using Minitab for Windows program (Yıldız and Bircan, 1991).

RESULTS AND DISCUSSION

Age composition of fish varied between 1 and 6. The most abundant age group was 2 (33.90 %) and followed by age of 3 (25.42 %), 4 (13.56 %), 5 (7.63 %) and 6 (0.085 %) respectively. Ages and sample sizes of fishes are given in Table 1. As it can be seen in Table 1, individuals at the age of two were dominant in the population and number of fish reduced throughout to the further ages. These results showed similarity to the data with the literature (Geldiay and Balık, 1977; Özdemir, 1982; Yanar, 1984; Erk'akan and Akgül, 1986; Ünlü, 1991). Average fork length values and total weight values changed from 12.10 to 31.2 cm and 21.37 - 313.20 g respectively in population (Table 2). Fork lengths and total weights were also presented based on ages and sexes in Table 2. Length frequency is illustrated in Figure 1.

In terms of weight comparison, average body weights were lower in females than in males. The reason for this situation has already been reported as a shortage in the number of caught aged fish in population (Özdemir, 1982; Baysal and Kutrup, 1994).

Table 1. Age composition and sample size of the *Capoeta capoeta umbla* in Tuzla stream, Karasu River.

Estimated	Female		Male		Total	
Age	N	%	N	%	N	%
I	9	7.63	13	11.02	22	18.64
II	16	13.56	24	20.34	40	33.9
III	15	12.71	15	12.71	30	25.42
IV	5	4.24	11	9.32	16	13.56
V	3	2.54	6	5.08	9	7.63
VI	-	-	1	0.85	1	0.85
Total	48	40.68	70	59.32	118	100

Table 2. Some properties of *Capoeta capoeta umbla* based on sexes in Tuzla river.

	Total Length (cm)			Total Weight (g)		
Age	Male	Female	Population	Male	Female	Population
I	12.60 ± 0.13	11.60 ± 0.37	12.10 ± 0.15	20.46 ± 0.14	23.15 ± 0.19	21.37 ± 0.17
II	15.04 ± 0.16	16.21 ± 0.20	14.77 ± 0.09	33.46 ± 0.18	41.28 ± 0.24	36.59 ± 0.20
III	19.92 ± 0.28	20.19 ± 0.34	20.05 ± 0.17	76.85 ± 0.32	81.63 ± 0.41	79.24 ± 23
IV	23.44 ± 0.38	23.64 ± 0.46	23.50 ± 0.40	126.63 ± 0.42	122.02 ± 0.21	125.19 ± 0.33
V	27.15 ± 0.00	27.36 ± 0.00	27.22 ± 0.14	191.81 ±0.43	187.73 ± 0.21	190.45 ± 0.31
VI	31.20 ± 0.00	-	31.20 ± 0.00	313.2 ± 0.00	-	313.20 ± 0.00

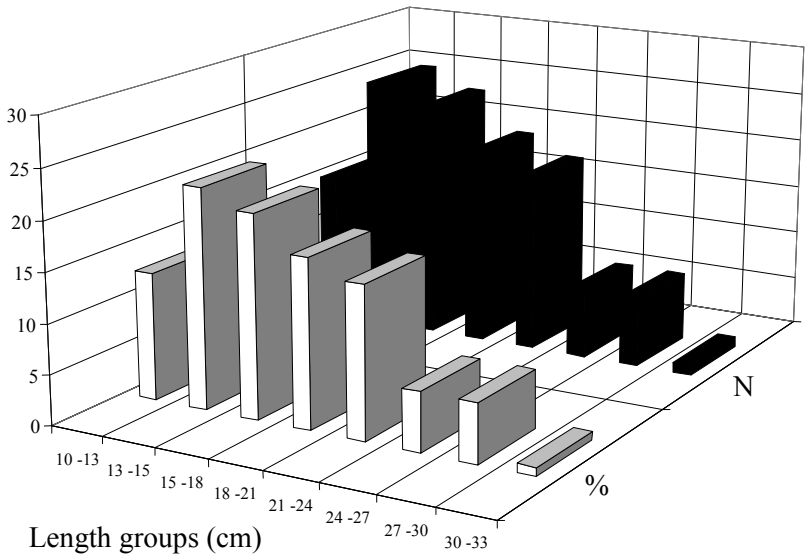

Figure 1. Fork length groups (cm) versus length frequency and sample size of *Capoeta capoeta umbla* in Tuzla stream of Karasu River

From the sex composition point of view, 40.68 % of the fish was female and 59.32 % was male. Female : male ratio was 0.686. This result showed similarity to the value with the literature (Şen, 1988) and dissimilarity to the data with the literature (Özdemir, 1982). Most of the males reached to their maturation periods in age 3, whereas females were reaching in age 4 in the population.

Absolute growth rates changed from 2.67 to 3.98 with an average of 3.82 in length and 15.22 - 122.75 with an average of 58.366 in weight. In terms of relative growth rates, those values were between 14.6 - 22.1 in length and 52.1 - 116.6 in weight respectively. Absolute growth rates and relative growth rates in terms of length and weight calculated by using data from Table 2 are presented in Table 3.

Table 3. Absolute and relative growth rates of *Capoeta capoeta umbla* in Tuzla stream.

Age groups	Absolute growth rate in length	Relative growth Rate in length (%)	Absolute growth rate in weight	Relative Growth rate in weight (%)
I	2.670	22.1	15.220	71.2
II	5.280	35.7	42.650	116.6
III	3.450	17.2	45.950	58.0
IV	3.720	15.8	65.260	52.1
V	3.980	14.6	122.750	64.5
Average	3.820	21.1	58.366	72.5

Average condition factor was obtained as 1.169 and it was 1.122 in females and 1.200 in males (Table 4). These values were in accordance with the data reported with the literature (Yanar, 1984; Erk'akan and Akgül, 1986).

Table 4. Condition factor related to age and sex in *Capoeta capoeta umbla* in Tuzla stream

	Condition Factor (K)		
Age groups	Male	Female	Population
I	1.241 ± 0.019	1.531 ± 0.029	1.333 ± 0.023
II	1.022 ± 0.012	1.026 ± 0.009	1.240 ± 0.018
III	1.151 ± 0.014	1.048 ± 0.010	1.109 ± 0.009
IV	1.400 ± 0.013	0.980 ± 0.009	1.090 ± 0.009
V	1.187 ± 0.009	0.973 ± 0.009	1.071 ± 0.009
Average	1.200 ± 0.137	1.112 ± 0.236	1.169 ± 0.112

Length - Weight relationship for population was calculated as:

$$LogW = -1.705 + 2.754 \log L$$

For females;

$LogW = -1.798 + 2.828 \log L$. And for males:

$$LogW = -1.656 + 2.715 \log L$$

"b" values was higher in females than in males and near to 3 in both. This value falled between the data range with the literature (Erkoyuncu, 1995). As a result, it can be stated that the Tuzla stream had a good feeding capacity for *Capoeta capoeta umbla*. Length - weight relationship of *Capoeta capoeta umbla* living in Tuzla stream is illustrated in Figure 2.

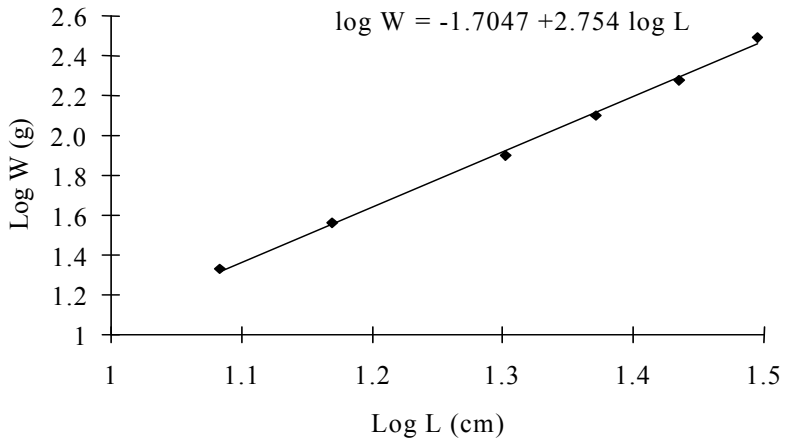

Figure 2. Length - weight relationship of *Capoeta capoeta umbla* in Tuzla stream

Mean meat yield was determined as 64.78 %, and it was 65.43 % and 64.37 % in females and males respectively. These values were higher than the data reported in (Çelikkale, 1977; Sarıhan, 1978; Akyurt, 1988), lower than that of (Şevik, 1993; Karataş, 1995) and was similar to the data in the literature (Akyurt, 1986).

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