

Some Population Parameters of *Capoeta capoeta* in River Asi (Hatay-Turkey)

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Abstract: This study was made on the scales of 198 *Capoeta capoeta* samples caught by electric fishing and fyke net in River Asi between February 2002 and January 2003 to define their growth characters were. Sex ratio was obtained in favour of males. Length-weight relationship was found $W = 0.005L^{3.24}$ ($R^2 = 0.95$). The von-Bertalanffy growth parameters were $L_{\infty} = 27.39$ cm, $K = 0.44^{year}$ and $t_0 = -0.92^{year}$.

Key words: *Capoeta capoeta*, River Asi, hatay, growth, length, sex distribution

INTRODUCTION

Out of totally 52 *Capoeta* genus across the world, six species inhabit Turkish waters (Geldiay and Balik, 2007). These include *Capoeta capoeta*, *C. trutta*, *C. tinca*, *C. pestai*, *C. damasina* and *C. barroisi*. Four species of *Capoeta* genus including *C. capoeta*, *C. trutta*, *C. damasina* and *C. barroisi* live in Asi region (Yalçın, 1999). These species prefer fast running water zones with gravel and rocky bottom. Though there are certain studies on the growth, feeding and reproduction of various species of *Copeata* genus inhabiting other areas (Sen *et al.*, 1987; Yılmaz and Solak, 1999), there is no on the members living in the Asi region.

This study aims to determine principal biological parameters including age, growth and weight-length relation for *C. capoeta* inhabiting the region.

MATERIALS AND METHODS

Rising in Lebanon, River Asi (Orontes) moves to North and flows through Syria before entering Turkey. After taking Karasu as a tributary near Antakya, it heads for South-West and pours into the Mediterranean in Samandağ (Fig. 1). River Asi is used for irrigation purpose in all the three countries. The Asi having a total length of 380 km flows 94 km within Turkey (Yalçın, 1999). The sampling station so called Güzelburç is a dwelling place on the Asi following the area where other tributaries join the river.

Sampling work was performed between February 2002 and January 2003 in Güzelburç parish with electric shockers and fyke-net. Exact sizing was accomplished with scale boards with 1 mm spacing. As to weighing, a precision balance with 0.01 g accuracy was used. The age of the fish was determined using the microscopic scale

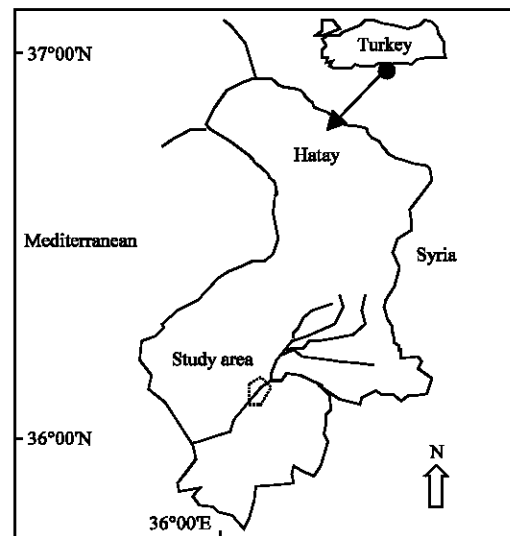


Fig. 1: Study area and river Asi in Turkey

method. Ten scales from the left side of the body between the lateral line and dorsal fin were removed. Scale specimens were prepared with a common practice (Bagenal, 1978; Bingel, 2002; King, 2007). They were read under a binocular microscope, scale reading being done twice, each time by a different person.

Sex determination was fulfilled through macroscopic and microscopic examination of gonads after opening the abdomen.

Those whose determination was carried out were classified into age groups before their age size and weight-length relations were estimated. Growth in size was assessed as both absolute and proportional growth parameters. Growth relations were also examined according to growth equations. For age to size relation the von-Bertalanffy growth equation was used:

$$L_t = L_{\infty} (1 - e^{-K(t-t_0)})$$

Where:

- L_t = The fish length at age t
- L_{∞} = The asymptotic fish length
- e = The base of natural log (2.71828)
- t = The fish age
- t_0 = The time at which the length of the fish is zero
- K = A relative growth coefficient

Growth performance index (Φ) widely was used for comparing fish growth (Sparre and Venema, 1992).

$$\Phi = \log(K) + 2\log(L_{\infty})$$

The relation of weight to total length was calculated applying the exponential regression equation:

$$W = aL^b$$

The parameters a and b of the L-W relationship were estimated by the least squares regression method. The significance of the regression was assessed by ANOVA, and was different from the predictions for isometric growth ($b = 3$).

Females and males distribution were checked with Ki square test.

RESULTS

Sex distribution: Gonads of 198 *C. capoeta* individuals were studied to reveal that 40% of the total catch were females while the males constituting the 60%, giving the 1.51:1 males to females ratio. Equal distribution of both sexes was tested with χ^2 -test. Sex ratio appeared at considerably higher values on behalf of males when compared with previous 1:1 ratio ($p = 0.05$).

Length frequencies: Total length frequencies of *C. capoeta* members caught are given in Fig. 2. Total lengths of females and males along with average values and standard durations range between 11-33 cm, while the weight varies between 18-24 cm.

Age-length relationship: Age and length relationship were determined in Fig. 3. The von Bertalanffy growth equations were: $L_{\infty} = 27.30$ cm, $K = 0.44^{\text{year}}$, $t_0 = -0.92^{\text{year}}$ and $\Phi = 2.51$.

Age distribution: Figure 4 shows the age distribution of *C. capoeta* individuals caught in River Asi. It was established that specimens had a distribution between 0 and 4 years of age. The highest number of individuals was among age 2 in both males and females.

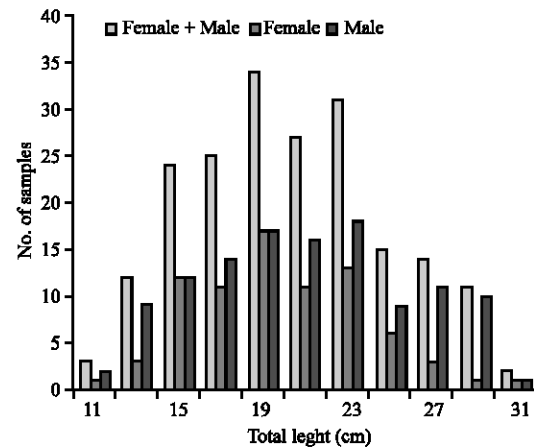


Fig. 2: The total length-frequency distribution of the fish used in the study

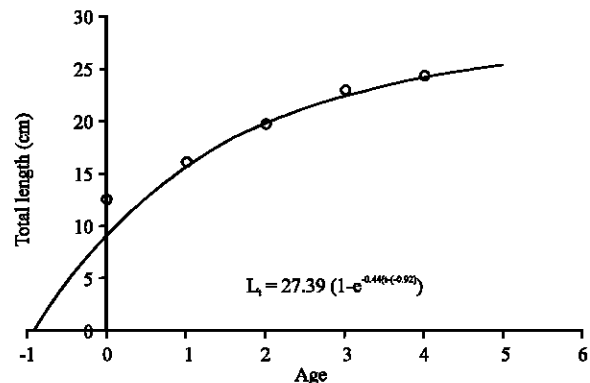


Fig. 3: The total length and age relationship

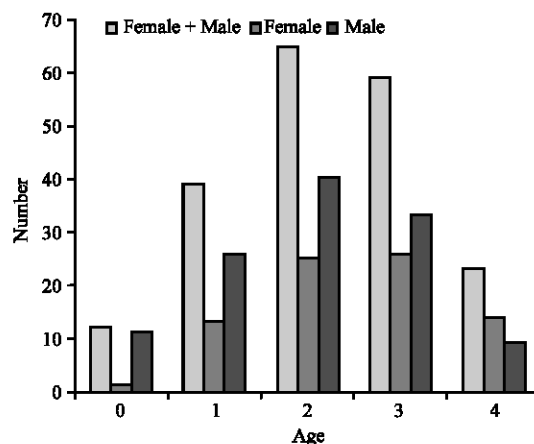


Fig. 4: Age distribution of the fish used in the study

Length to weight relationship: Length to weight relationship was calculated based on the data gathered from the 125 *C. capoeta* specimens. These were found to

Table 1: Parameters of the length-weight relationship and von Bertalanffy growth equation for *Capoeta capoeta* in different areas

Region	Age	b	L _∞	K	T ₀	Study
Karasu River	1-12	2.86	47.50	0.112	-1.02	Turkmen <i>et al.</i> (2002)
Kockopru Lake	1-6	2.99	58.20	0.152	-0.38	Elp and Karabatak (2007)
River Asi	0-4	3.24	27.39	0.440	-0.92	Present Study

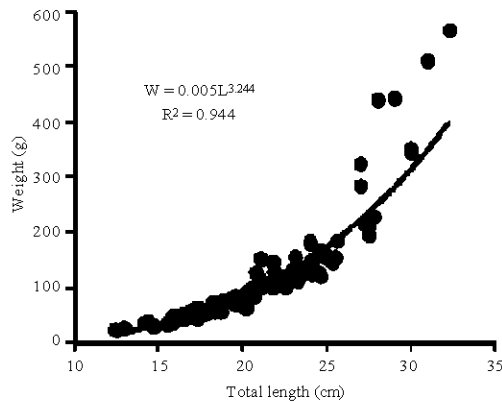


Fig. 5: The total length and weight relationship

be $W = 0.005L^{3.244}$ ($r^2 = 0.94$) (Fig. 5). The values were significantly different from 3.0, positive allometric growth.

DISCUSSION

Since, there is no detailed study of population parameters *C. capoeta* species in this region, the parameters couldn't be compared in detail with those of other populations. Therefore studies by Turkmen *et al.* (2002) and Elp and Karabatak (2007) at Karasu River (Erzurum) and Dam Lake Kockopru respectively were referred to for comparison.

Exploitation is seen to be the reason for the lack of older populations in the study area. Furthermore, unlike previous studies, this one being conducted in running water the depth of water might have restricted the length of fish. Total length groups according to various ages were lower than both studies. This can be explained by the theory that lengths in different age groups might differ in populations depending on environmental conditions (Nikolsky, 1963).

Table 1 shows that growth parameters by the von Bertalanffy in this study on River Asi was found to be higher than in the study of Karasu River and Lake Kackopru. The fact that K^{year} value is high despite exploitation indicates that the fish in the river median grows faster.

CONCLUSION

Result of the study shows that young population of *C. capoeta* which inhabit River Asi grow faster than other

populations. When length and weight distributions are looked into, there happens to be a decline in the number of populations after the weight of 100 g and length of 20 cm for the members gain commercial value after this size. It was also considered that members after this size are targeted in commercial fishing.

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