Observations on the age and growth of *Varicorhinus damascinus* (Val.) in Tigris river at Salahuldin province – Iraq∗

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Abstract

Age and growth of *Varicorhinus damascinus* (Val.) in Tigris river at Salahuldin province have been investigated. Monthly samples were taken during the period from September 1999 to August 2000, using small-meshed gill nets. The age data showed that there were six age groups and the dominant age groups were (III – IV) for both sexes. The results of the present study revealed that the increment in length of *V. damascinus* at the sites of study showed a tendency to decrease with the increase in age, after the third year of life in both sexes. The length-weight relationship of males and females were calculated and demonstrated in a straight line logarithmic formula, as follows:

Log   W = 1.5404 + 2.6885 log L   for males
           r = 0.95 (P > 0.05)
Log   W = 1.6723 + 2.7877 log L   for females
           r = 0.77 (P > 0.05)

The values of the regression coefficient (b) indicated that the growth of both sexes of *V. damascinus* was allometric..

Introduction

Varicorhinus damascinus (Val.)∗∗∗∗ is one of the five species of genus *Varicorhinus* which occurs in Iraqi inland waters. It is occurred in upper reaches of Tigris and Euphrates rivers and their tributaries (Khalaf, 1961, Beckman, 1962; Al-Daham, 1977).

Reviews, of the literature concerning the biological aspects of different Iraqi freshwater fish are not including information about the biology of *Varicorhinus damascinus*.

The present investigation was designed to deal with age and growth of *V. damascinus*. The study is a part of a larger study which is attempting to study the biology of different fish species from Tigris river at Salahuldin province.

Study Area

The sites of study situated within Salahuldin province area, mid of Iraq. The area of study extend from Albu-Tuaama village, to Al-Muhzam region north of Tikreet city. Two sites were selected at the right bank of the river to collect fish samples. The physical and chemical parameters of the river at the area of study summarized in table (1).

Several species of fish occured in the river at the area of study. The dominant species were *Barbus xanthopterus* (Heckel), *B. grypus* Heckel, *Cyprinus carpio* L., *Liza abu* (Heckel), *Varicorhinus trutta* (Heckel), in addition to the species under investigation which represents one of the most abundant species in the area of study.

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∗∗∗∗ Recent name *Capoeta damascina* (Val., 1842), (Froese and Pauly 2003)

Materials and Methods

A smal-meshed gill nets (2.5 **X** 2.5 and 3.5 **X** 3.5 cm) were used to collect monthly samples of *Varicorhinus damascinus* from two sites at Tigers river during the period from September 1999 to August 2000 (Figure 1).

The specimens were measured using total length, Viz, from the tip of the snout to the end of caudal fin. The numbers measured and aged are listed in table (2). Scales were used to determine the age and growth of fish.

Results and Discussion

I.   Age Distribution:

In the present investigation seven year classes were obtained (seven for females and six for males). One and two years old fish (O-I groups) were not caught.

The age structure of the population, was dominated by four and five years (III-IV groups). The dominance of four and five years fish at the sites of study is difficult to explain but is though related to the fact that gill net missed some of the small fish as they were able to pass through the nets or escape by swimming under stone at some sites (Dauod, 1986; Dauod and Al-Rubai, 1996; Dauod, et al., 1999 and Dauod and Hammady, 2001).

II. Length and Growth:

The length measurement are more reliable indictor of growth than weight data since they are less susceptible to fluctuation (Treasurer, 1976). The number of fish examined, the main length per age class and their ranges are shown in table (3). The average growth of fish in the sites of study is illustrated in figure (2). It can be seen from the figure and the data listed in table (3) that the most rapid growth of the fish took place in the second, third and forth years of life and then the annual increment decrease gradually. Once more it is important to note that there is no scientific data about the age and growth of *V. damascinus* to discus and compare the

present data. Dauod (unpublish data) recorded same results in another species belong to the same genus (*V. trutta*) at the same sites. This probably supported even weakly the results of the present investigation due to the evolutionary facts, and that both species lived under the same environmental condition.

III. Total Length-Weight Relationship:

The total length-weight relationship in males and emales *V.damascinus* are illustrated in figure (3) and expressed by the following equations:

Log   W = 1.5404 + 2.6885 log L for males
r = 0.95 (P > 0.05)

Log   W = 1.6723 + 2.7877 log L for females
r = 0.77 (P > 0.05)

The results of the present study declare that the growth of both sexes was allometric, as the values of (b) less than (3) (Nikolsky, 1963; Bagenal and Tesch, 1978). Previous literatures listed several factors effected positively or negatively the values of (b) such as sex, maturity stage, seasons, gut or stomach fullness and gear selectivity (Tesch, 1970; Dauod, 1976, 1986, Ahmed, 1987....inter alia). The results of the present study suggested that (b) values effected by gear selectivity. This results agree with the foundation of Dauod (1976), who studied this relationship in *Varicorhinus trutta*.

IV.Condition Factor:

The values of condition factors for males and females fish during different months illustrated in figure (4). It is clear from the figure that the highest values recorded during the breeding season months,(Al-Ibady, 2001).
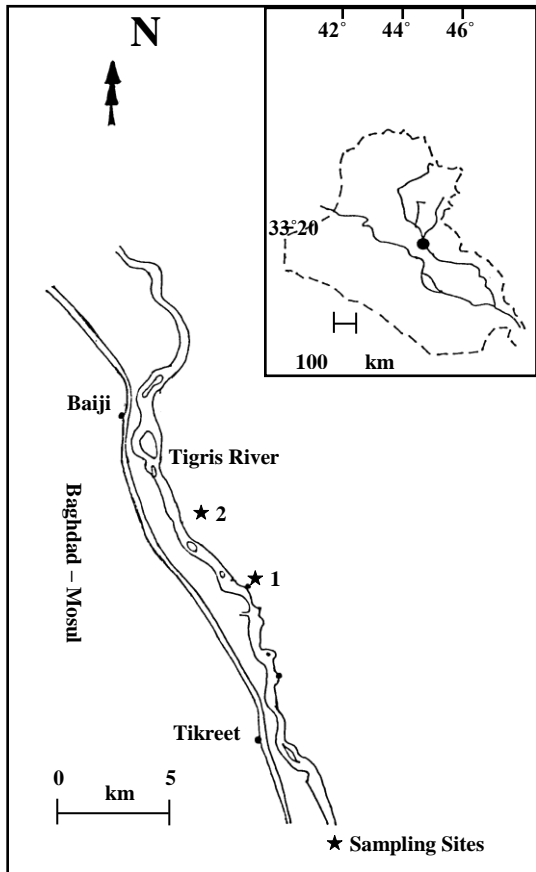
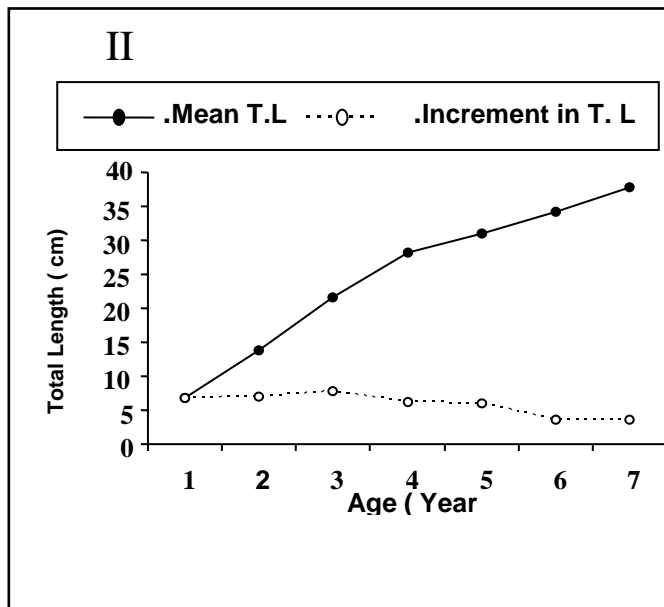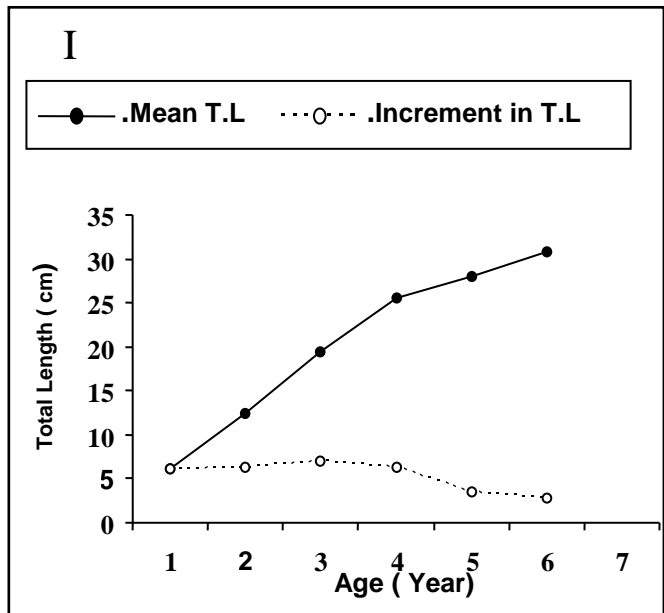**Figure (1): Location of study area indicating sampling sites.**

Figure (2):The average growth and annual increment in length of males (I) and females (II) of *V. damascinus* at the sites of study.
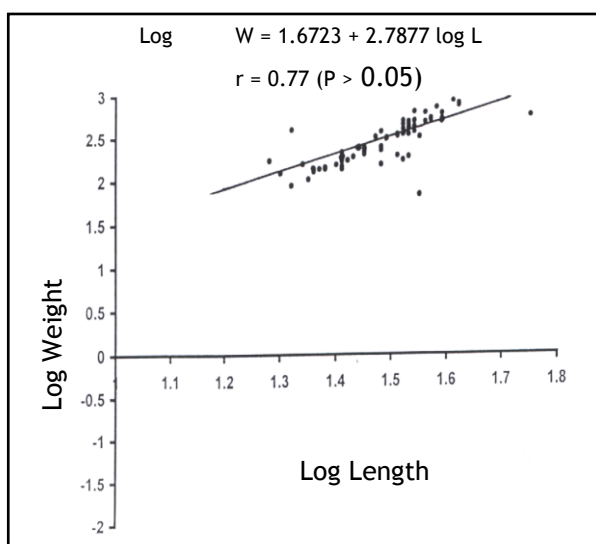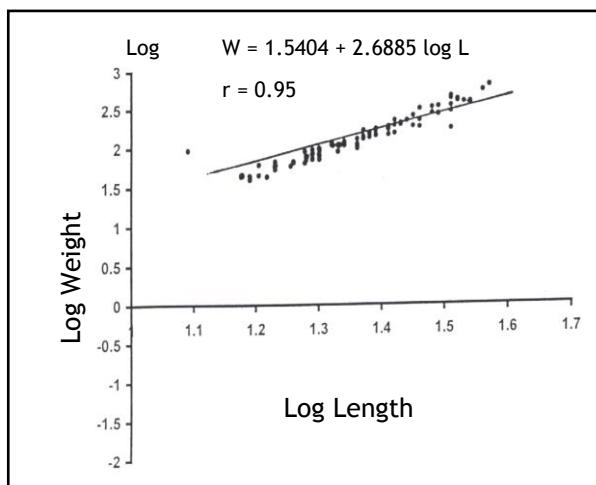
Figure (3):Logarithmin Length-Weight relationship of males and females _V. damascinus_ at the sites of study.

Table(1): Some of physical and chemical parameters of water Tigris river at the area of study (Al-Douri, 2000)

Physical &chemical parameters	Station(1)	Station(2)
Air Temperature (C°)	15.8-44.2	14-44.3
Water Temperature (C°)	12.3-29.7	12.6-29.6
Dissolved Oxygen (mg/l)	3.05-7.9	3.25-9.75
pH	7.37-8.26	7.4-8.26
Conductivity (mhos)	341-551	349-553
Calcium Hardness (p.p.m)	85-195	90-200
Chloride (p.p.m)	24.5-38.5	24.5-40.25
Alkalinity (p.p.m)	68.38-161.71	89.4-155.25

Table (2): Number of _Varicorhinus damascinus_ caught and sampling date in the area of study

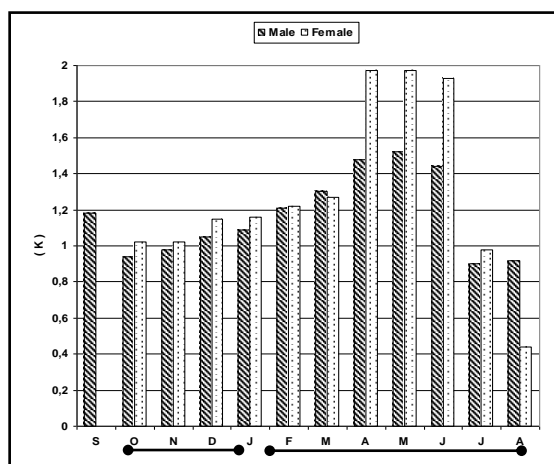| Month	Sample Size	Number aged & sexed
September-1999	20	20
October	5	5
November	10	10
December	9	9
January-2000	15	15
February	18	18
March	15	14
April	20	17
May	18	17
June	17	17
July	11	6
August	14	10
Total	172	158

Figure (4):Monthly variations in condition factor f _V. damascinus_ in Tigris river at Salahuldin province

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Table (3). Mean (-) and Ranges of length (cm) at each growth period of *V. damascinus* (Uppr rows for male fish, lower rows for female fish)

3	Number of Fish	Observed Total Length	Length at Age classes																				
			1			2			3			4			5			6			7		
VI	-	-	-			-			-			-			-			-			-		
	3	38.66	6.5	7.0	7.5	11.0	12.83	15.0	15.5	20.5	24.0	20.0	26.5	31.5	27.5	32.17	37.0	30.0	33.0	35.5	33.0	37.83	42.0
V	7	33.57	5.0	5.78	6.5	11.0	12.36	14.5	17.0	19.36	22.0	21.0	25.36	30.0	26.0	28.21	30.0	28.0	30.79	36.0			
	15	36.5	5.0	5.93	8.0	10.0	13.2	17.0	17.5	21.87	25.5	23.0	29.47	33.5	30.0	32.33	34.5	26.5	37.1	41.5			
IV	24	29.23	4.5	5.97	8.0	7.5	12.48	17.0	15.5	20.21	25.0	18.0	19.48	21	21.5	26.89	37.5						
	36	30.06	4.5	6.79	10.0	8.5	14.28	24.0	13.5	22.38	31.0	16.5	23.73	29	18.5	28.69	35.0						
III	51	21.48	4.5	6.22	10.0	8.0	12.43	19.0	14.0	17.94	21.5	15.5	18.47	27.0									
	13	23.88	4.5	7.08	10.0	9.5	14.12	19.0	15.0	17.77	21.0	16.0	21.65	27.0									
II	8	17.06	4.5	6.87	9.5	8.5	11.0	14.0	9.0	12.44	16.5												
	1	19.0	7.0	7.0	7.0	10.5	10.5	10.5	14.5	14.5	14.5												
I	-	-	-			-			-			-			-			-			-		
	-	-	-			-			-			-			-			-			-		
Mean Length (cm)			6.21			12.43			19.35			25.62			28.05			30.79			-		
			6.76			13.79			21.6			28.22			31.06			34.14			37.83		
Increment of Mean Length (cm)			6.21			6.22			6.92			6.27			3.57			2.74			-		
			6.76			7.03			7.81			6.26			5.92			3.58			3.69		

Age Group   I   (fish at 2nd year of age)
                    II   (fish at 3rd year of age)
                    |
                    |
                    |
                    VI   (fish at 7th year of age)

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ملاحظات عن العمر والنمو في سمكة التيلة الدمشقية *Varicorhinus damascinus* (Val.)في نهر دجلة عند محافظة صلاح الدين ـ العراق

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الخلاصـــة

تمت دراسـة العمر والنمو لسـمكة التيلـة الدمشقية (.Val) *Varicorhinus damascinus* فـي نهر دجلـة عند محافظة صلاح الدين. أخذت عينات شهرية للسمكة موضوع الدراسة خـلال الفترة أيلول 1999 إلـى آب 2000، باستخدام شِباك خيشومية صغيرة السعة. أوضحت نتائج دراسة العمر وجود ستة مجـاميع عمر، وكانـت مجـاميع العمر السـائدة هي (IV–III) في كلا جنسي السمكة. نتائج الدراسة الحالية أوضحت أن معدلات الزيادة في الطول في سمكة التيلة الدمشقية عند موقع الدراسة تظهر نقصاناً مع تقدم العمر، بعد السنة الثالثة من العمر في كلا جنسي السمكة. تم حسـاب علاقة الطـول الكلي بالوزن لذكور وإناث سمكة التيلة الدمشقية والمعبر عنها بمعادلة الخط المستقيم وكالتالي:

للذكور   Log $W = 1.5404 + 2.6885 \log L$
                         $r = 0.95 \ (P > 0.05)$

للإناث   Log $W = 1.6723 + 2.7877 \log L$
                         $r = 0.77 \ (P > 0.05)$