Observations on the Age and Growth of Shank (*Acanthopagrus latus* (Houttuyn, 1782)) from Al-Razzazah Lake

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Abstract

From February 2007 to January 2008, monthly samples of shank (*Acanthopagrus latus*) were taken from three stations at Al-Razzazah lake,by using a range of gill nets and seine nets. A total of 318 fish were taken from all stations. The age data determined from the scales showed that there were eight age classes present in station 1 and 2 and seven age classes in station 3. The increment in length of *A. latus* at the area of study showed a tendency to decrease with the increase in age after the fourth year of life.

The length- weight relationships of both sexes specimens are expressed by the following equations:

$\text{Log}\,\omega = -1.93 + 2.67\ \text{Log}\,\ell$ ….. for station (1) fish

$\text{Log}\,\omega = -2.08 + 2.74\ \text{Log}\,\ell$ …. For station (2) fish

$\text{Log}\,\omega = -2.02 + 2.39\ \text{Log}\,\ell$ …. For station (3) fish

It seems from the above equations that the growth of *A. latus* in the area of study is allometric.

Introduction

Decreased catches of different fish species from Al-Razzazah lake have caused anxiety among the General Board for Fish Resources Development (GBFRD) during the year 1996. The (GBFRD) suggested to introduce some fish species from Shatt Al-Arab, south of Iraq, in an attempt to cultivate *Mugil* sp., in the lake, since then *A. latus* which was introduced randomly with *Mugil* sp. became the most abundant fish species available in the lake [1].

A. latus is one of marine fish belonging to the family Sparidae, which is represented by more than 120 species. It is an economic fish in west Indian ocean countries. It is represented in Arabian Gulf by several species including the species under investigation [1,2].

The present paper reports part of an extensive study which was carried out in an attempt to study the biological aspects of the species under investigation. One of the major drawbacks with the current investigation is almost the lack of the scientific data about the age and growth of this fish in Al-Razzazah lake with the exception of the preliminary data reported by Mansour[1] who used the length frequency distribution to determine the age.

It is hoped that the information obtained would be of interest to ichthyologists who are looking to cultivate suitable species of fish in Al-Razzazah lake as it is subjected to sever water level fluctuation which affects the hydrological condition in the lake and community structures of the contained macro invertebrates.

Area of Study

Al-Razzazah lake is one of the largest water body in Iraq. It is situated in North west of Karbala city at 43°54′ & 43°22' E, and 32°13′ & 33°9' N. The maximum length of the lake

is about 76Km from the beginning of Al-Majarah channel to the white valley near Karbala city, while the maximum width is about 40Km[3].

The area of the lake is in between (1050-1700)Km^2, and the capacity of the lake is (4.85-250.25)Km^3. The maximum depth is 17.0m, and the mean depth is (4.6-11.9)m [3]. The geology of the area is the sandstone underlying clay[4].

Several fish species occur in the lake, *Barbus xanthopterus*, *B. grypus*, *B. esocinus*, *B. luteus*, *B. sharpeyi*, *Aspius vorax* and *Liza abu* [3].

Al-Razzazah lake is subjected to water level fluctuation which leads to sever changes in the hydrological condition of the lake and the community structures of the contained macroinvertabrates. It is not possible to say how much damage has been caused to the flora and fauna by the fluctuating water levels nor is it possible to surmise neither or not community structures have altered.

Materials and Methods

Acanthopagrus latus fish was obtained from three stations at Al-Razzazah lake within Karbala province area Fig.(1) Monthly samples were taken during the period from February 2007 to January 2008, by using gill & sein netting.

The specimens were measured by using total length (TL) and wet weight of each fish were recorded to the nearest 1mm and 0.1g respectively. The numbers measured and aged fishes are listed in table (1). Scales of each fish were removed, cleaned, dried and fixed between two glass slides, and then the age read from them.

Results and Discussion

Age Distribution:

The age structure of the population revealed that there were eight age classes at the area of study. These results agree with the data reported by Mansour [1] who used length-frequency distribution to determine the age.

The results of the present study showed that the population of *A. latus* in the area of study was dominated by four and five years. The dominance of four and five years through the period of investigation, is difficult to explain but is though related to the fact that nets missed some of the small fishes which were able to escape by swimming under stones at some sites, or perhaps due to the gear selectivity [5, 6, 7].

Length and Growth:

Treasurer [8] has indicated that the length measurements are more reliable indicator of growth than weight data since they are less susceptible fluctuation. The number of fish examined, the mean length per age class and their ranges at the sites of study are shown in tables (2,3 and 4).

The average growth of fishes in the area of study is illustrated in figures (2,3 and 4).

It seems from the above tables and figures that the highest increment in length appear during the 2^{nd}, 3^{rd} and 4^{th} years and then showed a tendency to decrease with the increase in age after the 4^{th} year of life. It is important to note that there is no scientific data about the age and growth (increment of length) of *A. latus* in Al-Razzazah lake to discuss and compare the present results.

The growth of *A. latus* in the area of study seems to be poor. This is not unexpected as the lake is oligotrophic (4).

Several workers including [6, 9,10,11] agree that the best fish growth is achived in alkalin water. It is also generally accepted that where fishes are plentiful, as well as fast growing invertebrates are present in abundance[6,9,10].

The poor ionic content of water and the paucity of the invertebrate fauna are militate against Al-Razzazah fishes. One further complication in Al-Razzazah lake is the fluctuation

of water levels which lead to marked changes in the productivity of the water body [6, 11,12, 13].

In the present study, results obtained for the age and growth of *A. latus* showed low growth rate in comparison with the data reported from other water bodies [14,15,16]. This low growth rate may be related to the different environmental factor such as the temperature, availability of food and/ or the ionic content of water [6, 9,10].

The relationships between the length and weight of *A. latus* at the different stations, derived by fitting straight lines to the logarithms of the two variables, were expressed by the following equations:

$\text{Log } \omega = -1.93 + 2.67 \text{ Log } \ell$ ….. for station (1) (Al-Shuaib) fish
$\gamma = 0.99$

$\text{Log } w = -2.08 + 2.74 \text{ Log } \ell$ …. For station (2) (Al-Rahalia) fish
$\gamma = 0.78$

$\text{Log } w = -2.02 + 2.39 \text{ Log } \ell$ …. For station (3) (Ain Temer) fish
$\gamma = 0.93$

It seems from the above equations that the growth of *A. latus* at Al-Razzazh lake is allometric as the regression coefficient (b) values are less than 3 [17].

The results of the present study differ numerically from that reported by Mansour [1]. Review of the literature showed that there are several factors affected the length- weight relationship such as age, maturity of gonads, sex and the time of catch [18,19]. It seems that the above factors may be militated agains the relationship in the present study in comparison with the data reported by Mansour[1].

In conclusion, it appears that *A. latus* fish have managed to maintain themselves naturally in Al-Razzazah lake, which means that they introduced to a suitable environment. Nevertheless it would provide better returns and should at least be given a trial as it is the only course of action which will improve the current situation until the fluctuating water levels are corrected.

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Table (1): Numbers of fish caught and aed on each sampling data at each site

Month	Station (1) (Al-Shuaib) Number aged	Station (2) (Al-Rahalia) Number aged	Station (3) (Ain Tamr) Number aged
February 2007	10	11	9
March	10	12	10
April	12	11	10
May	13	11	12
June	-	-	-
July	12	13	13
August	-	-	-
September	-	-	-
October	7	12	9
November	14	15	12
December	13	12	14
January 2008	14	14	13
Total	105	111	102

Table (2): Mean(…) and range of length of *A. Latus* at the end of each growth period (Station 1- Al-Shuaib).

Age	Number of fish	Length at age							
		1	2	3	4	5	6	7	8
8	2	(5.25) 4.4-6.0	(8.75) 5.5-12	(14.0) 11.0-15.0	(19.0) 14.5-23.5	(23.0) 20.5-25.5	(26.5) 24.0-29.0	(29.5) 28.0-31.0	(32.0) 30.5-33.5
7	5	(5.5) 4.5-7.0	(9.2) 7.5-12.5	(13.5) 12.0-17.5	(18.5) 17.0-24.0	(23.2) 22.0-25.0	(26.2) 23.5-28.0	(29.7) 27.0-31.5	-
6	9	(5.5) 4.5-8.5	(10.22) 8.0-13.0	(14.5) 11.5-17.0	(19.5) 16.0-22.5	(23.5) 21.0-25.0	(26.3) 23.5-28.5	-	
5	25	(6.0) 4.0-9.0	(10.0) 7.5-12.0	(16.5) 12.5-19.5	(21.5) 18.0-24.0	(24.0) 22.0-26.5	-		
4	34	(6.25) 4.5-8.0	(10.5) 7.0-12.0	(17.5) 11.5-19.5	(22.5) 17.5-24.0	-			
3	22	(5.5) 5.0-8.0	(10.5) 7.0-12.5	(16.25) 12.0-17.5	-				
2	8	(5.25) 5.0-7.5	(10.0) 7.0-13.0	-					
1	-	-	-	-	-	-	-	-	-
Over all	105	(5.8) 4.0-9.0	(9.9) 5.5-13.0	(15.4) 11.0-19.5	(20.2) 14.5-24.0	(24.3) 21.0-26.5	(26.3) 23.5-29.0	(29.6) 27.0-31.5	(32.0) 30.5-33.5
Increment of mean Length (cm)		5.8	4.1	5.5	4.8	4.1	3.0	3.3	2.4

Table (3): Mean(…) and range of length of *A.Latus* at the end of each growth period (Station 2- Al-Rahalia)

Age	Number of fish	Length at age							
		1	2	3	4	5	6	7	8
8	1	(4.0) 4.0-4.0	(7.5) 7.5-7.5	(10.5) 10.5-10.5	(16.2) 16.2-16.2	(21.5) 21.5-21.5	(24.5) 24.5-24.5	(26.5) 26.5-26.5	(29.0) 29.0-29.0
7	3	(6.0) 5.5-6.5	(10.0) 6.0-12.0	(14.5) 9.5-18.0	(19.7) 17.5-24.0	(23.36) 23.0-27.0	(26.3) 25.5-28.0	(29.0) 27.0-30.0	-
6	7	(5.78) 5.0-6.5	(10.36) 6.0-14.5	(15.36) 13.0-18.0	(20.36) 18.0-27.5	(24.17) 24.5-30.0	(27.8) 26.0-32.0	-	
5	29	(5.97) 4.5-8.0	(11.0) 7.0-15.0	(15.5) 14.5-16.0	(20.0) 14.5-26.5	(24.0) 23.0-29.5	-		
4	33	(6.5) 5.0-8.5	(11.5) 8.0-14.5	(14.5) 13.0-15.5	(19.5) 14.5-27.0	-			

3	**25**	(5.5) 4.5-8.0	(11.5) 7.5-15.0	(15.5) 14.0-21.0	-				
2	**12**	(5.4) 4.5-10.0	(10.3) 9.5-14.0	-					
1	**-**	-	-	-	-	-	-	-	-
Over all	**111**	(5.6) 4.0-10.0	(10.3) 6.0-15.0	(14.3) 9.5-18.0	(19.2) 14.5-27.5	(23.3) 21.5-30.0	(26.2) 24.5-32.0	(27.7) 26.5-30.0	(29.0) 29.0-29.0
Increment of mean Length (cm)		5.6	4.7	4.0	4.9	4.1	2.9	1.5	1.25

Table (4): Mean(…) and range of length of *A.Latus* at the end of each growth period (Station 3- Ain-Tamr)

Age	**Number of fish**	**Length at age**							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
8	**-**	-	-	-	-	-	-	-	-
7	**2**	(6.5) 5.0-8.0	(9.5) 7.5-12.0	(14.5) 11.0-18.0	(20.25) 16.5-24.0	(24.0) 23.0-25.0	(26.5) 25.0-28.0	(28.75) 27.5-30.5	-
6	**11**	(5.8) 4.5-8.5	(8.5) 7.0-11.5	(14.12) 10.0-17.5	(20.27) 16.0-23.0	(24.12) 21.0-26.0	(27.89) 24.0-29.0	-	
5	**24**	(5.97) 4.5-8.0	(9.48) 7.5-13.0	(15.21) 12.5-19.0	(20.48) 18.0-23.0	(24.2) 22.0-26.0	-		
4	**36**	(5.79) 4.5-9.0	(10.28) 9.5-13.0	(15.38) 12.5-19.0	(20.73) 17.0-25.5	-			
3	**15**	(5.93) 5.0-8.0	(10.2) 6.5-13.5	(15.47) 11.0-19.5	-				
2	**14**	(5.87) 5.0-9.0	(10.5) 9.5-12.5	-					
1	**-**	-	-	-	-	-	-	-	-
Over all	**102**	(5.9) 4.5-10.0	(10.6) 6.5-13.5	(14.9) 10.0-19.5	(20.1) 16.5-25.5	(24.2) 21.0-26.0	(27.2) 24.0-29.0	(28.75) 27.0-30.5	-
Increment of mean Length (cm)		5.9	4.7	4.3	5.2	4.1	3.0	1.5	

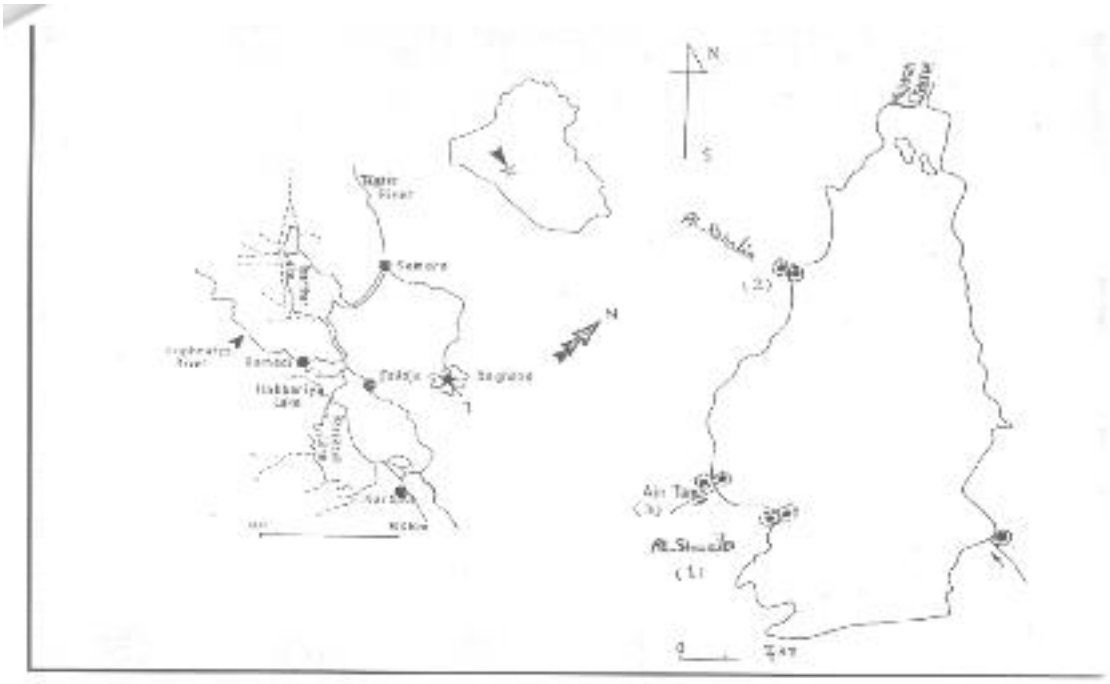

Fig. (1): Location of study area. * sampling station

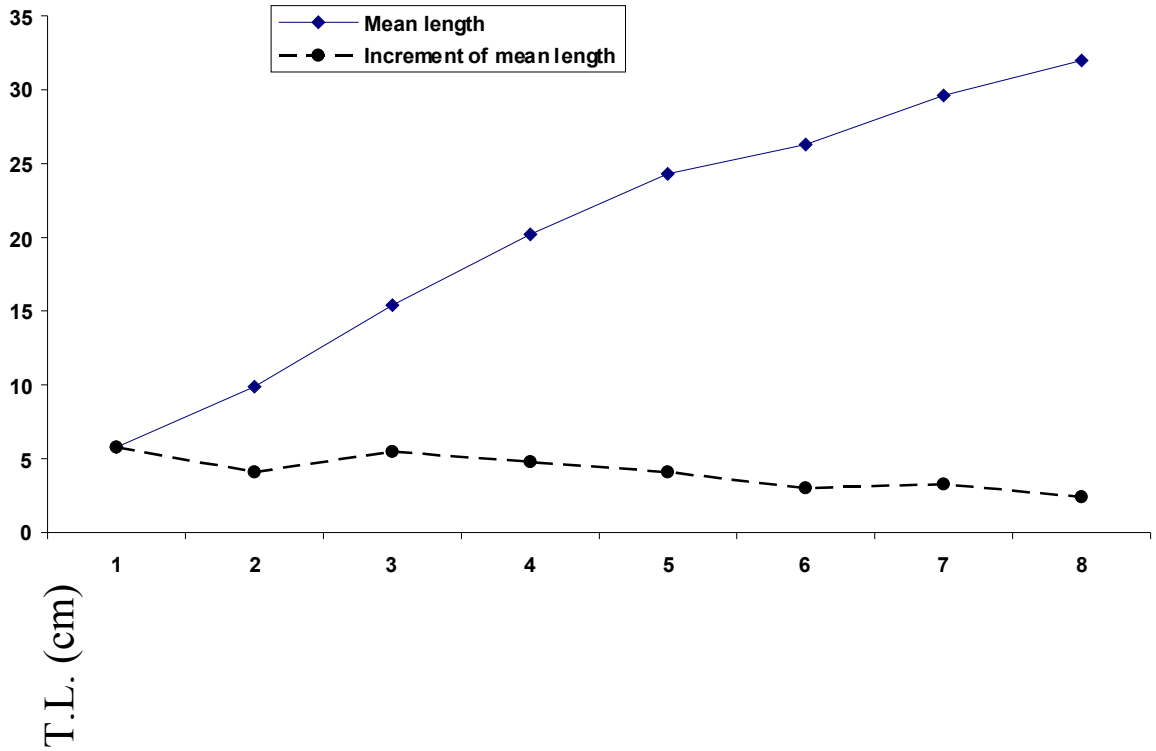

Fig.(2) : Mean length and increment of mean length in A. latus at station (1). (Al-shuaib)

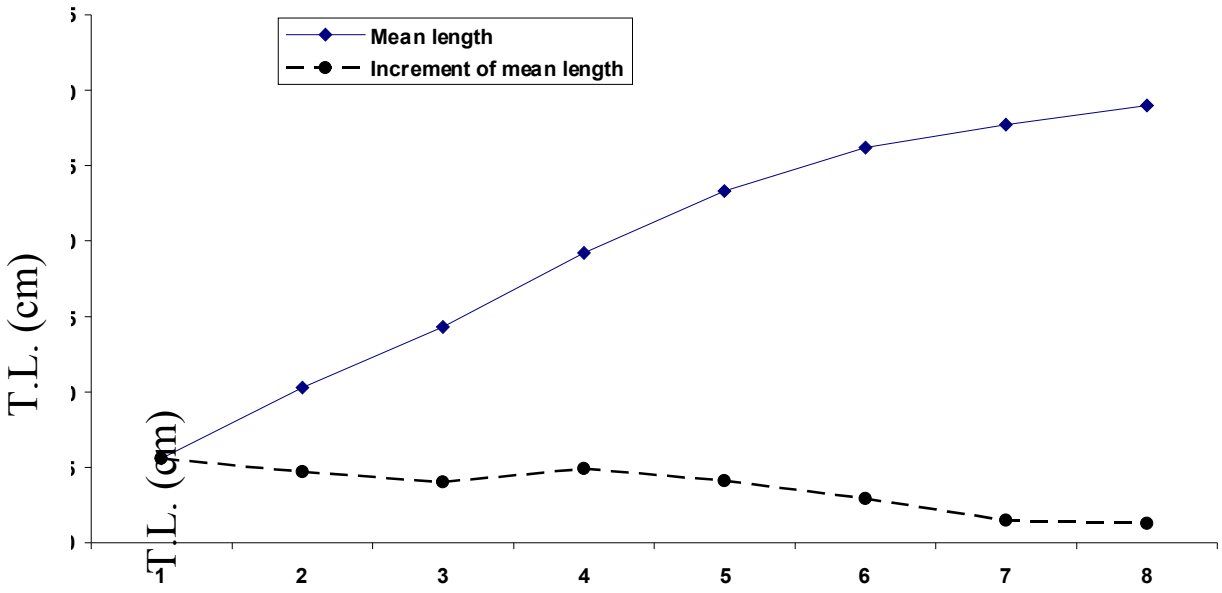

Fig. (3) : Mean length and increment of mean length in A. latus at station (2). (Al-Rahalia)

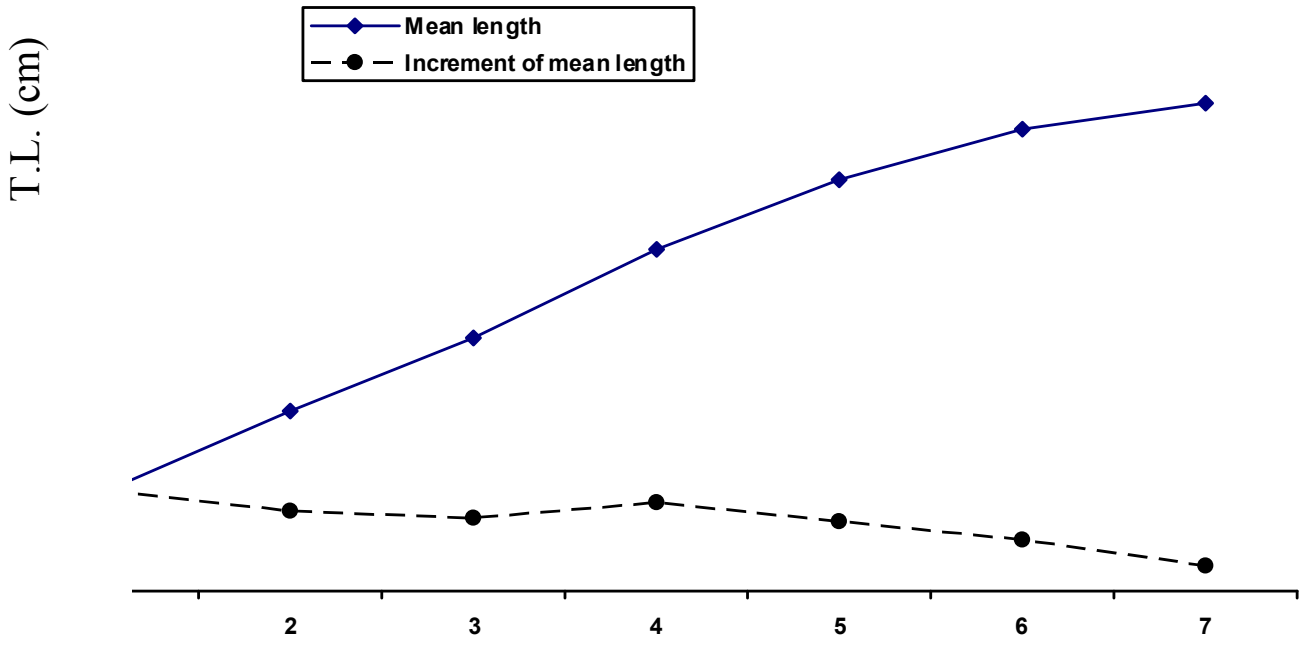

Fig. (4) : Mean length and increment of mean length in *A. latus* at station (3).(Ain Tamr).

ملاحظات عن العمر والنمو في سمكة الشانك *Acanthopagrus latus* (Houttuyn, 1782) في بحيرة الرزازة

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الخلاصة

يتم خلال المدة الممتدة من شباط 2007 الى كانون الثاني 2008 جمع عينات شهرية (318 سمكة) لأسماك الشانك *Acanthopagrus latus* من ثلاث محطات على بحيرة الرزازة، واستخدمت في عملية الصيد شباك خيشومية مختلفة السعة وشباك كرفة. أظهرت نتائج الدراسة الحالية ومن خلال استعمال القشور لحساب العمر إن هناك ثمان مجاميع عمرية في المحطتين الاولى والثانية (الشعيب والرحالية)، وسبع مجاميع في المحطة الثالثة (عين تمر).

أظهرت معدلات الزيادة في الطول إشارة إلى النقصان مع زيادة العمر بعد السنة الرابعة من العمر. تم التعبير عن علاقة الطول بالوزن بالمعادلات الآتية:-

أسماك المحطة الأولى ..... $\text{Log}\,\omega = -1.93 + 2.67\ \text{Log}\,\ell$

أسماك المحطة الثانية .... $\text{Log}\,\omega = -2.08 + 2.74\ \text{Log}\,\ell$

أسماك المحطة الثالثة .... $\text{Log}\,\omega = -2.02 + 2.39\ \text{Log}\,\ell$

وهو ما يؤشر نمواً غير قياسي ل(Allometric) لان معامل الارتباط اقل من (3).