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COMPARATIVE STUDY OF SOME BIOLOGICAL ASPECTS OF SOLEA AEGYPTIACA CHABANAUD, 1927 IN MEDITERRANEAN SEA AND LAKE QARUN, EGYPT.

BY

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ABSTRACT

*Estimation of length-weight relationship and condition factor, were done for **Solea aegyptiaca** Chabanaud, 1927 collected from Abu-Kir off Alexandria and Lake Qarun during the period of 1993-1994. This study is carried out to determine the suitability of environmental conditions in the Mediterranean Sea and Lake Qarun for this species.*

*The computed length-weight relationships for **Solea aegyptiaca** in both areas showed that, for all lengths, the calculated weights are heavier from Lake Qarun than those from Abu-Kir Bay and highly significant difference is observed between the two habitats at 1% level.*

*The mean value of condition factor (K) was found to be higher in **Solea aegyptiaca** from Lake Qarun than those from Abu-Kir Bay and this variation is statistically highly significant at 1% level.*

INTRODUCTION

The interspecific variations of ***Solea aegyptiaca*** Chabanaud, 1927 from Abu-Kir Bay off Alexandria and Lake Qarun were determined by studying the length-weight relationship and condition factor.

The length-weight relationship and condition factor of sole fishes in different regions have been studied by several authors (El-Zarka, 1963; De Veen, 1976; Ezzat ***et al.***, 1982; Vianet ***et al.***, 1989).

It is important to compare the population of ***Solea aegyptiaca*** in Mediterranean Sea off Alexandria and those in Lake Qarun to know whether the transplanted sole in Lake Qarun has become a distinct population or not.

MATERIALS AND METHODS

The length-weight relationship and condition factor of ***Solea aegyptiaca*** Chabanaud, 1927 were based on data of 205 specimens (combined sexes) collected from natural habitat, i.e. Abu-Kir fishing center and 236 specimens (combined sexes) collected from Lake Qarun.

The length-weight relationship for ***Solea aegyptiaca*** was determined by the least squares method (Beckman, 1948; Le Cren, 1951; Bagenal, 1978), and represented by the following equation:

$$W = aL^b$$

where W and L are the weight in g and total length in cm of the fish, respectively and a, b are constants. This equation can be expressed by the linear equation:

$$\log W = \log a + b \log L$$

where b is the regression coefficient and a is the intercept of the line on the Y-axis.

In the present work, the gutted weight is used in order to exclude the effect f stomach contents and weight of gonads (Lagler, 1956; Ricker, 1975).

The length-weight relationship was statistically analyzed by the method of analysis of covariance as suggested by Snedecor and Cochran (1967).

The coefficient of condition (K) was calculated from the equation:

$$K = 100\ W/L^3$$

i.e., Falton's condition factor, where W = gutted weight in grams, L = total length in Cm. This factor is often used as an approximation even when the allometric factor is theoretically more appropriate (Ricker, 1975; Bagenal 1978).

The mean values of condition factor were statistically analyzed by the method of t-test analysis as suggested by Snedecor and Cochran (1967).

RESULTS

The length-weight relationships and condition factor for ***Solea aegyptiaca*** from Abu-Kir and Lake Qarun are given in Tables (1 & 2) and Figure (1).

It can be seen that, for all lengths, the calculated weights of ***Solea aegyptiaca*** collected from Lake Qarun are heavier than that collected from Abu-Kir fishing center.

To test if the regressions are significantly different for the fishes captured from the two habitats i.e., from Abu-Kir Bay off Alexandria and Lake Qarun, analysis of covariance is employed. Covariance analysis shows that there is highly significant differences between the two habitat at 1% level.

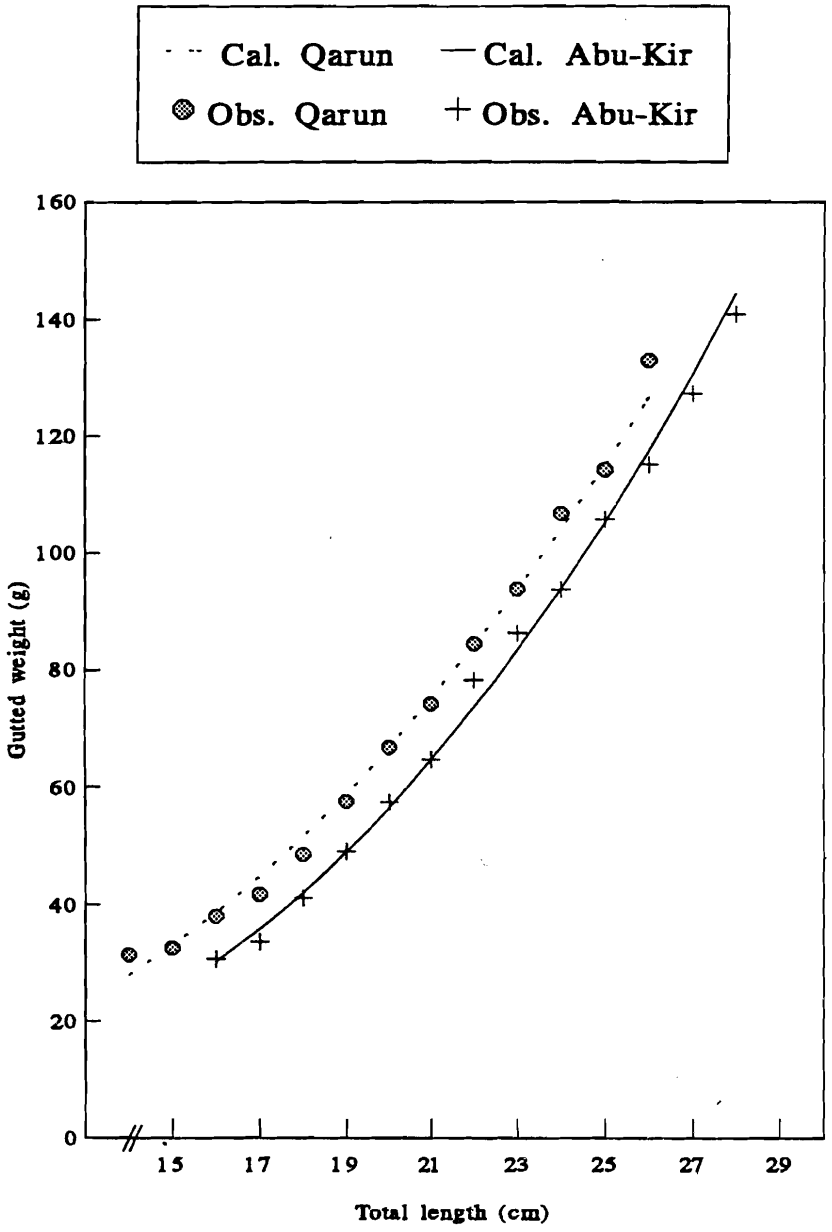

Figure 1. Length-weight relationships of *Solea aegyptiaca* from Abu-Kir and Lake Qarun.

Table (1): Length-weight relationship and condition factor of ***Solea aegyptiaca*** from Abu-Kir.

Total length (cm)	No. of fish*	observed weight (g)	Calculated weight (g)	Condition factor (K)
16	2	30.6	30.12	0.747
17	9	33.6	35.70	0.684
18	12	41.1	41.90	0.705
19	17	49.0	48.74	0.714
20	20	57.4	56.27	0.718
21	22	64.6	64.51	0.698
22	23	78.3	73.49	0.735
23	27	86.3	83.23	0.709
24	29	93.8	93.77	0.679
25	18	105.8	105.13	0.677
26	11	115.1	117.33	0.655
27	9	127.2	130.41	0.646
28	6	140.9	144.39	0.642

*Total number of fish; 205.

Table (2): I ength-weight relationship and condition factor of ***Solea aegyptiaca*** from Lake Qarun.

Total length (cm)	No. of fish*	observed weight (g)	Calculated weight (g)	Condition factor (K)
14	2	31.3	27.81	1.141
15	7	32.5	32.93	0.963
16	19	38.0	38.57	0.928
17	22	41.7	44.74	0.849
18	21	48.4	51.45	0.830
19	39	57.5	58.73	0.838
20	50	66.7	66.59	0.834
21	31	74.1	75.04	0.800
22	13	84.4	84.09	0.793
23	11	93.9	93.75	0.772
24	9	106.8	104.04	0.773
25	8	114.2	114.98	0.731
26	4	132.9	126.56	0.756

*Total number of fish; 236.

Table (3) shows comparison of regressions of length-weight relationship for ***Solea aegyptiaca*** from Abu-Kir Bay and Lake Qarun.

The mean values of condition factor was found to be higher in ***Solea aegyptiaca*** of Lake Qarun (0.847) than ***Solea aegyptiaca*** of Abu-Kir Bay off Alexandria (0.693) and this variation is statistically highly significant at 1% level.

Table (4) shows the difference in condition factor of ***Solea aegyptiaca*** from Abu-Kir Bay and Lake Qarun by using t-test.

DISCUSSION

The length-weight relationship is one of the fundamental parameter in the field of fishery management. The value of b is usually around 3, it varies widely from one species to another and between different populations of the same species (Bagenal, 1978).

In the present study the calculated weights of ***Solea aegyptiaca*** collected from Lake Qarun are heavier than that collected from Abu-Kir Bay as well as the analysis of covariance for the regressions shows a highly significant differences between the two habitat at 1% level.

The result of the present study agrees with those of El-Zarka (1963), and Ezzat ***et al.*** (1982).

The variation in growth rate of weight between different regions are mainly attributed to water temperature (Minet, 1974; Alliot ***et al.***, 1983; Vianet ***et al.***, 1989) and food availability (Minet, 1974; Wassef and El-Emary, 1989). El-Zarka (1963) and Al-Kholy and Abdel-Malek (1972) mentioned the fauna of the lake and pointed out that the fauna offer a good food supply and consequently, the Sole fishes were heavier in that lake. Bakhoum (1994) showed that the fish in suitable environmental conditions are more heavier.

Table (3): Comparison of regressions of length-weight relationship for ***Solea aegyptiaca*** from Abu-Kir and Lake Qarun.

Location	a	b	r	F_B	F_M
Abu-Kir	0.01279	2.80050	0.9981	15.367**	51.706**
Lake Qarun	0.04355	2.44758	0.9954		

a = intercept; b = slope; r = correlation coefficient;
F_B = test of slope; F_M = test of adjusted mean, and ** significant at 1% level.

Table (4): Test of significance of condition factor of ***Solea aegyptiaca*** from Abu-Kir and Lake Qarun.

Location	Range	Mean ± S.D.	Cal. t
Abu-Kir	0.642-0.747	0.693±0.0329	4.836**
Lake Qarun	0.731-1.141	0.847±0.1100	

**Significant at 1% level.

The condition factor or the coefficient of condition (K) has been used to indicate the suitability of an environment for a certain fish species by comparison of the values for a specific locality with that of others (Ricker, 1971). The determination of condition factor of fish species is very useful in comparing two or more fish populations living under similar or different conditions (Weatherly, 1979).

In the present study, the average condition factor for ***Solea aegyptiaca*** is equal to 0.693 and 0.847 respectively for fishes from Abu-Kir Bay and Lake Qarun, and the mean values are statistically highly significant at 1% level. The value of condition factor shows that the growth of ***Solea aegyptiaca*** from Lake Qarun is better than that of Abu-Kir. The values of K at different lengths are relatively higher in small fishes than larger ones and this means that, the smaller fishes are in a better condition than the larger ones in both Lake Qarun and Abu-Kir.

Wassef (1985) showed that the higher condition factor may reflect the effect of high temperature on food availability and fish condition. Wassef ***et al.*** (1985) and Wassef & El-Emary (1989) mentioned that the peaks of condition may be reflection of feeding activities. Bakhoum (1994) showed that the suitability of environmental conditions in a region with high mean value of condition factor.

The higher mean value of condition factor, in the present study, for ***Solea aegyptiaca*** from Lake Qarun indicate the suitability of environmental condition and show the effect of high temperature in lake water on food availability and condition factor. From all aspects, it is clear that the environmental conditions in Lake Qarun are more suitable for growth of ***Solea aegyptiaca*** than those in Mediterranean Sea.

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