**Egyptian Journal for Aquaculture**
P-ISSN: 2090-7877
E-ISSN: 2636-3984
www.eja.journals.ekb.eg/
Salem *et al.,* 2023; 13 (2):40-47
DOI: 10.21608/eja.2021.85066.1050

# Length weight relationship, condition factor and length at first capture of *Chelon auratus* (Risso, 1810) golden grey mullet in Bardawil lagoon, North Sinai.

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Received:07 Sept. 2021; Accepted:15, Sept.,2021 published:2023 Vol.13 (2):40-47

## ABSTRACT

Bardawill lagoon is one of the most important lagoons in Egypt as a source of good quality fish and a habitat for wildlife. Monthly samples of golden grey mullet were collected from fishermen operating at various landing sites in Bardawil lagoon, North Sinai Egypt, during the fishing season 2020- 2021. Some biological aspects were studied such as the relationship between length and weight and the condition factor (K) were studied. For in *Chelon auratus* lengths ranged from 14.5–33.8 cm and total weight ranged between 27.0 – 237.20 gm. The total length - total weight relationship was estimated as TW= 0.0257 $TL^{2.652}$, TW= 0.0344 $TL^{2.5296}$, and TW= 0.0239 $TL^{2.652}$ for sexes combined, males and females, respectively. The highest condition factor was observed in October. The length at first capture Lc= 19.20 and 20 cm for females and males, respectively. The objective of this study is to determine current biological status of this species in Bardawil lagoon.

**Key words**: *Chelon auratus, biological aspects, Bardawil lagoon, Length weight relationship.*

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## INTRODUCTION

Bardawil lagoon is a shallow hyper saline lagoon located in the middle of the Mediterranean coast of Sinai. The approximate length is 75 km, and the maximum width is 19 km. The surface area is about 595 km2. The lagoon is extremely shallow, and the water depth never exceeds

3 m. A long sandbar, 1 km wide maximum, separates the lagoon from the adjacent Mediterranean **(Fouda, 1985)**. Family Mugilidae is a common commercial resource of Egyptian waters distributed from the Eastern coastal at Rafah to western at El-Salloum, and through the northern Egyptian lakes. Golden grey mullet locally named "Dhabana", is a mugilid fish of marketing value for fisheries, especially in north sinai waters. It is distributed in vast coastlines as in northeastern Atlantic waters and Mediterranean and Black seas **(Kesiktaş, 2020)**. *Chelon auratus* stocks need to regulate, monitoring and management to continuously for fisheries sustainability. This research is focused on its biological characteristics.

## MATERIALS AND METHODS

During six months from October 2020 to March 2021, totally 478 specimens from Golden grey mullet *C. auratus* were collected monthly from local markets.

*Measurements*

The Total weight (TW) measured nearest to 0.01 gm and total length (TL) nearest to 0.1 cm. Total lengths of *C. auratus* measured was ranged between 14.5 to 33.8 cm for females and between 15.5 to 27 cm for males, also, total weights were ranged between 27.0 – 237.20 gm for females and between 32.3 – 148.06 gm for males. The relationship between length and weight was described by the potential equation as $W = a*L^b$ **(Ricker, 1975)**, where (W) is proportional to a certain power (b) of the total body length (L). (a) & (b) are constants whose values were estimated by the least square methods.

The relative condition factor (Kn) was computed by using **Le Cren (1951)** formula and adopted by **Pope and Kruse (2006)**: as: $Kn = W/W^*$ or $Kn = W/ a (TL)^b$

Where, Kn: is the relative coefficient of condition. W: is the observed weight in gm. and, W*: is the calculated weight in gm.

The length at first capture (Lc), was determined from the accumulated catch curve as described in **Pauly (1984)**.

## RESULTS AND DISCUSSION

### 1- Length weight relationship

Length weight relationship was measured for 232 males and 246 females' samples and computed a and b as 0.0257 and 2.6271 for both males and females respectively. The coefficient (b) as a slope of this regression line was significantly less than (3) this means that the total weight of this species shown negative allometric growth with its total length which b<3 for males, females and both sexes **(Fig. 1)**.

Fishes' length weight relationship is likely affected by some factors such as: habitat, sex, season, gonad maturity, diet, stomach fullness and length variability of specimens. The present length weight relationship equation is $TW= 0.0257\ TL^{2.652}$ for both sexes, $TW= 0.0344\ TL^{2.5296}$ for males, and $TW= 0.0239\ TL^{2.652}$ for females. These results are agreed with **Campillo (1992**) which b= 2.49 and 2.62 for females and males also **Dulcic and Glamuzina (2006)** found b= 2.7 for both sexes. The isometric growth of golden grey mullet *Chelon auratus* was observed by **Mehanna (2006)** she found $TW= 0.0086\ TL^{2.9356}$ for both sexes, also the same result observed by **Djabali *et al.* (1993**) and **Koutrakis & Tsikliras (2003**). The positive allometric growth was observed by **Moutopoulos *et al.* (2013**) they found b= 3.26, **Verdiell-Cubedo *et al.* (2006**) on Mar Menor Lagoon found b= 3.19.

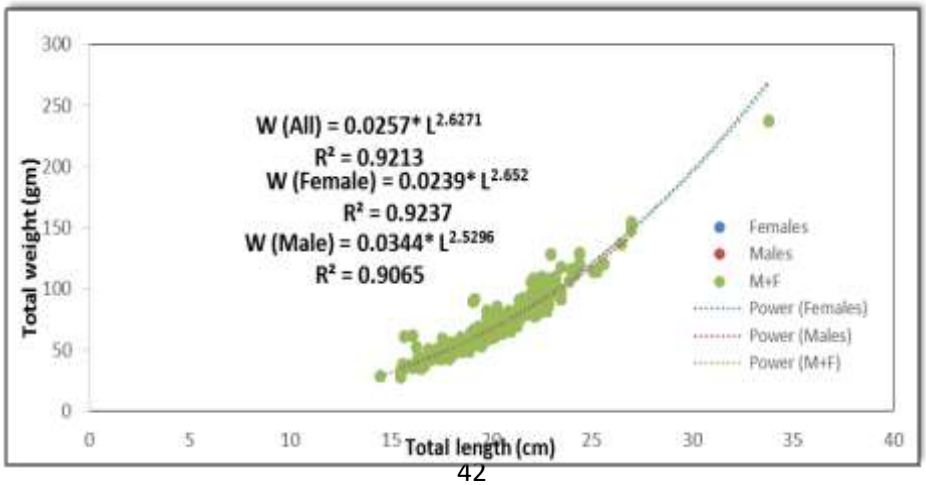

**Fig. 1.** Length-weight relationship of *Chelon auratus* from Bardawil lagoon.

## 2- Condition factor (Kn)

This qualitative measure is usually based on a visual assessment of the fish, taking into account the general shape of the fish, its length and weight, and its appearance **(Al-Beak, 2015)**. During six months from October to March golden grey mullet males and females show fluctuations in its body condition as the seasonal variation in temperature **(Fig. 2)**, where it was at highest values (Kn= 1.13) at the end of the summer then it decreases by the end of winter (Kn= 1.01). This may be contributed to the beginning of the reproductive season in October, where the gonad weight of *C. auratus* increases and Kn reach to its maximum level for both sexes then it decreases by the end of the reproductive season in winter, as the gonad weight gets lower and the sea surface temperature goes colder.

The relative condition factor of *C. auratus* males and females was studied separately by size group, where it was at the maximum value (Kn= 1.10) at size group 24-24.9 cm for males, but it was at a minimum value (kn= 0.96) at size group 17-17.9 cm. Also, it was at the maximum value (Kn= 1.06 and1.05 at size group 16-16.9 and 24.0-24.9 cm for females, but it was at a minimum value (kn= 0.96) at size group 15-15.9 and 26-26.9cm.

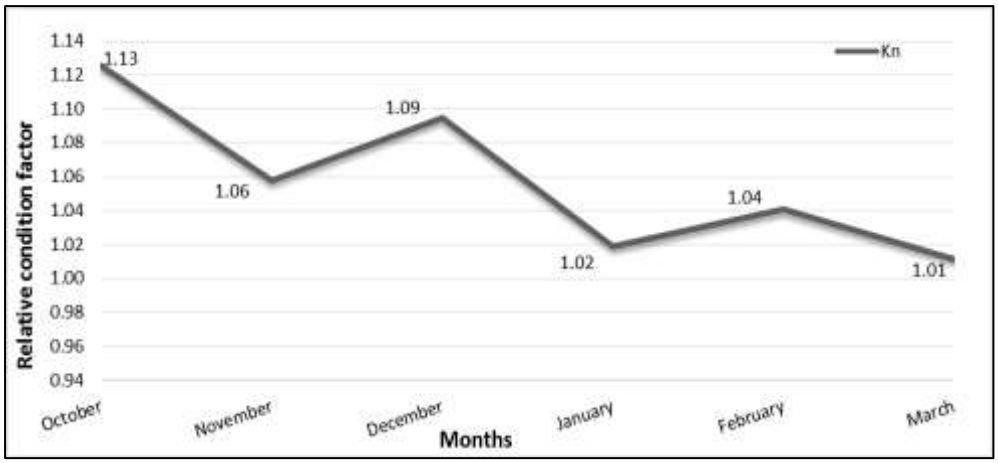

**Fig. 2.** Relative condition factor "Kn" of *Chelon auratus* males and females from Bardawil lagoon.

The condition factor values depend on season, habitat, age, and sex **(Hotos *et al*., 2000)**. However, the condition factor of mullet from adjacent estuaries of the Black Sea mostly ranged between 0.7 and 1.1 **Bilgin *et al*. (2006)**, which similar to current study. By other hand, in the Golden Horn Estuary, Turkey, **Kesiktaş (2020)** found most condition factor values of *C. auratus* ranged between 1.0 and 1.5 (lowest 0.68). The higher condition factor found in the Sea of Marmara may be related to the high nutrient capacity of the Golden Horn estuary **(Albayrak *et al*., 2010)**.

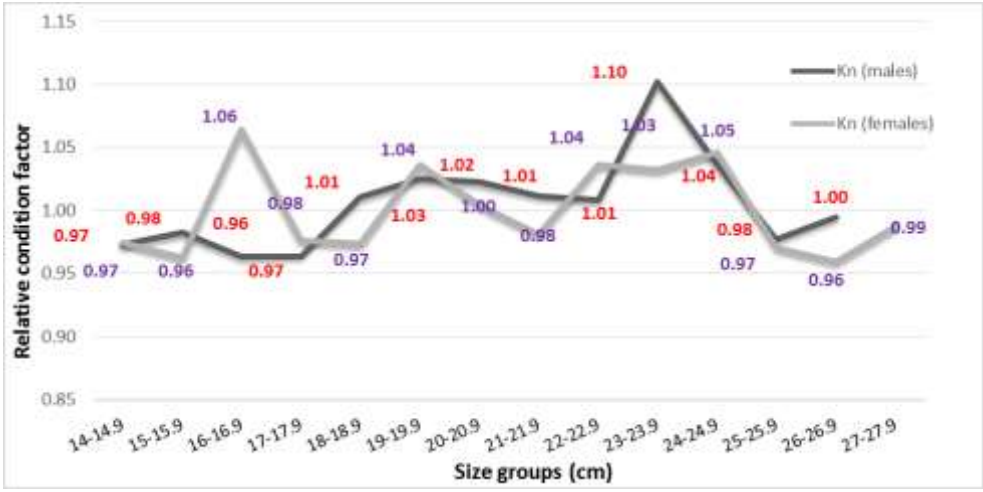


**Fig. 3.** Relative condition factor "Kn" of *Chelon auratus* from Bardawil lagoon by size group.

## 3- Length at first capture (Lc)

The size at 50% captured for golden grey mullet was estimated at TL= 19.20 and 20 cm for females and males respectively **(Fig. 4)**. The smallest length recorded in the catch Lr was 14.5 and 15.5 cm for females and males, respectively. The current Lc value of *C. auratus* for both males and females are very closed which means that fishing gear did not distinguish between sexes and there is no difference between sexes in fishing rates. These results are greater than previous values of *C. auratus* on Bardawil lagoon done by **Mehanna (2006)** which found the length at

first capture of golden grey mullet was (Lc= 16.92 cm), these results were reflected the good management of this important fisheries resource.

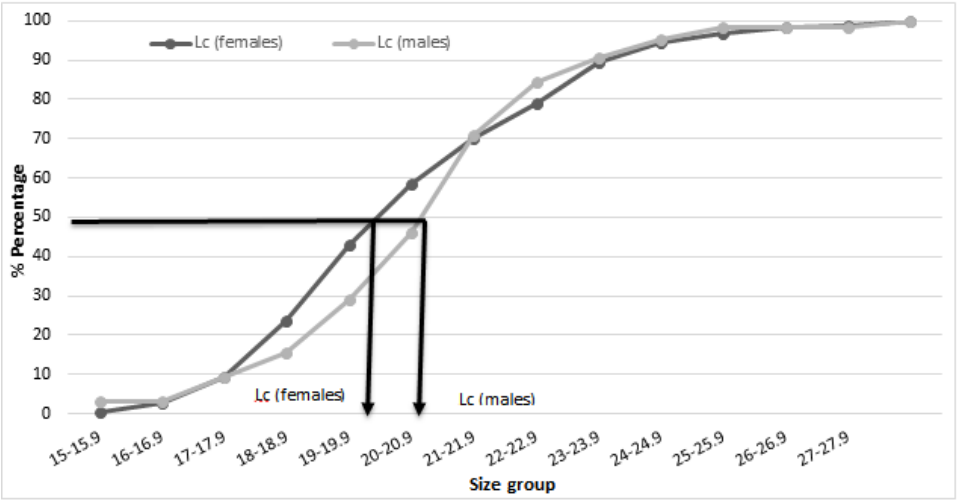


**Fig. 4.** Length at first capture "Lc" of *Chelon auratus* from Bardawil lagoon by size group.

## CONCLUSION

This study revealed some biological aspects of golden grey mullet in Bardawil lagoon and compare these results with previous research to assess the current management tools in this important fisheries resource.

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