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Length-weight relationship of *Mugil cephalus* (Linnaeus, 1758) from Bandar Abbas Port and Qeshm Island in northeastern Persian Gulf

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ABSTRACT

The length-weight relationship was derived for Mugil cephalus (Linnaeus, 1758) from Bandar Abbas Port and Qeshm Island in northeastern Persian Gulf. A total of 71 adult individuals of the M.cephalus were collected by stake-net and preserved in 4% formalin. Total length and weight ranged from 16.1 to 32.6 cm and 102.8 to 487.9 g, respectively. The Length-weight (LWR) was determined according to the power regression model. The relationship between total length and weight was described for M. cephalus in Bandar Abbas Port $W= 0.0234L^{2.9118}$ *(R2 = 0.9657) and in Qeshm Island* $W= 0.0277L^{2.9018}$ *(R2 = 0.9412).*

Keywords: Mugilidae, growth, regression, Fish morphology, Ichthyology

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INTRODUCTION

The study of length-weight relationship (LWR) of fish is important in fisheries biology and population dynamics where many stock assessment models require the use of LWR parameters [1]. As length and weight of fish are among the important morphometric characters, they can be used for the purpose of taxonomy and ultimately in fish stock assessment [2]. The actual relationship between length and weight may depart from the cubic value 3 and this may be due environmental condition in which the animal lives and also due to the physiological condition of the animal [3]. Weight-length relationships (WLR) are used for estimating the weight corresponding to a given length of fish [4], based on the assumption that heavier fish of a given length are in better condition. The grey mullet *Mugil cephalus* (Linnaeus, 1758) is a cosmopolitan species that is distributed in tropical and temperate zones at latitudes 42°N–42°S [5]. This species is rare in Iranian freshwaters [6], wherever Akbari [7] records this species from creeks and coastal waters of Hormozgan. In Hormozgan coastal area, it is caught by cast net and stake-net and it is an important fish as food item [8]. Ghelichi and Jorjani [9] state that this species is expected to play an important future role in fish culture in Iran. To rational and effective fisheries management, determination of exploitive fish stock is too important, because each stock needs separate management to aim of optimal harvest [10, 11]. Although grey mullet is reported from Bandar Abbas Port formerly [7], however, there are no studies showing the present length-weight status of *M. cephalus* stocks in the Bandar Abbas Port (BAP) and Qeshm Island (QMI). The aim of the present study was undertaken to elucidate the length-weight relationship of *M. cephalus* from northeastern Persian Gulf to evaluate the differences between the grey mullet communities of Bandar Abbas Port (BAP) and Qeshm Island (QMI).

MATHERIAL AND METHODS

A total of 71 adult individuals of the *Mugil cephalus* (Linnaeus, 1758) were collected from Bandar Abbas Port (27°18'N, 56°26'E) (BAP) (37 specimens) and Qeshm Island (26°69'N, 55°61'E) (QMI) (34 specimens) in northeastern Persian Gulf, Iran in June 2014 (Fig. 1). The specimens were caught by stake-net and were preserved in 4% formalin and sent to the marine biology laboratory of Khorramshahr University of Marine Science and Technology. For each specimen, total length (TL) was measured to the nearest 0.01 (cm) and whole body wet weight was measured the nearest 0.1 (g) [12]. The length-weight relationship was estimated by using following equation:

$W=aL^b$

Where (W) is the whole body weight (g), (L) is the total length (cm), (a) is the intercept of the regression and (b) is the regression coefficient (slope) [13]. The parameters (a) and (b) of the length-weight relationship was estimated by the least-squares method based on logarithms [14]:

$\text{Log } (W) = \log (a) + b \log (L)$

RESULTS AND DISCUSSION

Overall 71 fish were measured. The sample size, the minimum, maximum and mean length and weight (±STD) of *Mugil cephalus* (Linnaeus, 1758) from Bandar Abbas Port and Qeshm Island in northeastern Persian Gulf are presented in Table 1. The minimum, maximum and mean length of *M. cephalus* from Bandar Abbas Port was 17.8, 32.6 and 24.68 ± 4.25 (cm) and minimum, maximum and mean weight was 121.1, 487.9 and 288.5 ± 137.57 (g) respectively (Table 1). The minimum, maximum and mean length of *M. cephalus* in Qeshm Island was 16.1, 30 and 23.32 ± 3.87 (cm) and minimum, maximum and mean weight was 102.8, 466.3 and 289.69 ± 131.59 (g) respectively (Table 1). Relationship between length-weight of *M. cephalus* from Bandar Abbas Port and Qeshm Island in northeastern Persian Gulf are presented in Figure 2, 3 and Table 2. The relationship between total length and weight was described for *M. cephalus* in Bandar Abbas Port $W= 0.0234L^{2.9118}$ ($R2 = 0.9657$) and in Qeshm Island $W= 0.0277L^{2.9018}$ ($R2 = 0.9412$). (Figure 2 and 3) and (Table 2). In equation of the length-weight relationship ($W = a L^b$), the parameters (a, b) are important in stock assessment studies when b = 3, increase in weight is isometric. When the value of b is other than 3, weight increase is allometric (positive if b > 3, negative if b < 3) [15]. The parameter b for *Mugil cephalus* (Linnaeus, 1758) from Bandar Abbas Port and Qeshm Island in northeastern Persian Gulf were 2.9118 and 2.9018 respectively which we determined a isometric increase in weight. This result is confirmed by [16, 17], who studied this fish in Indian coasts and by [18, 19], who studied this fish in African coasts. The parameters of the fish, LWRs are affected by a series of factors including season, habitat, diet, health, temperature, salinity, food availability [4, 12, 20]. Thereupon *M. cephalus* has an isometric and satisfactory growth because of rather well condition of Persian Gulf for it.

Table 1: Length characteristics (cm) and weight characteristics (g) of *Mugil cephalus* (Linnaeus, 1758) from Bandar Abbas Port (BAP) and Qeshm Island (QMI) in northeastern Persian Gulf

	Bandar Abbas Port			Qeshm Island		
	Min	**Max**	**Mean ± STD**	**Min**	**Max**	**Mean ± STD**
Length	17.8	32.6	24.68 ± 4.25	16.1	30	23.32 ± 3.87
Weight	121.1	487.9	288.5 ± 137.57	102.8	466.3	289.69 ± 131.59

Table 2: Regression parameters of Length-weight relationship for *Mugil cephalus* (Linnaeus, 1758) from Bandar Abbas Port and Qeshm Island in northeastern Persian Gulf

	n	**a**	**b**	**R^2**
Bandar Abbas Port	37	0.0234	2.9118	0.9657
Qeshm Island	34	0.0277	2.9018	0.9412

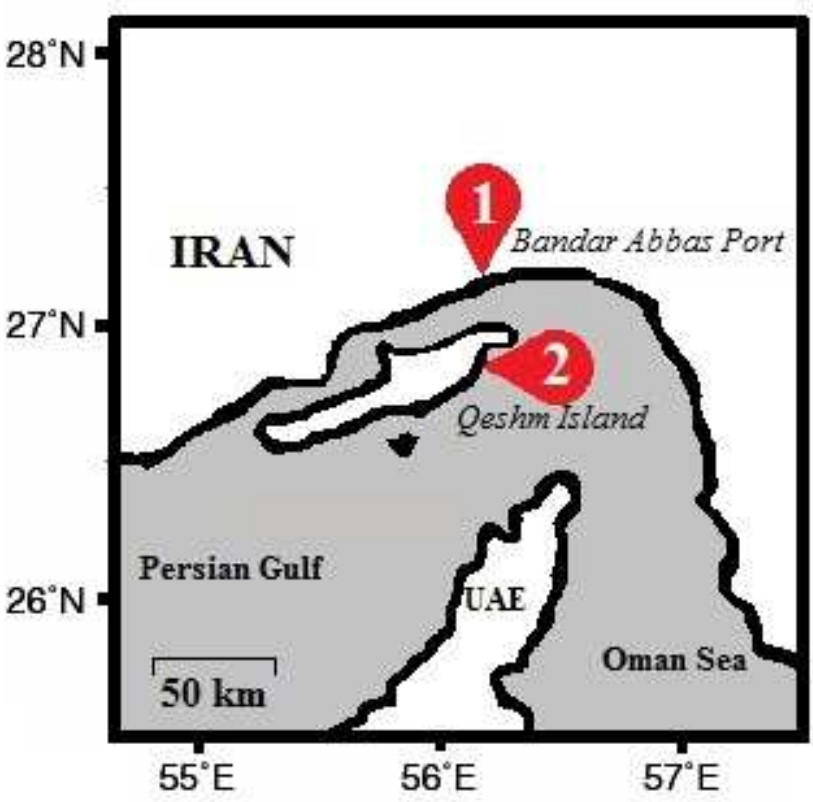

Fig1. The map of northeastern Persian Gulf showing the location of fishing regions of *Mugil cephalus* (Linnaeus, 1758) from Bandar Abbas Port (1) and Qeshm Island (2)

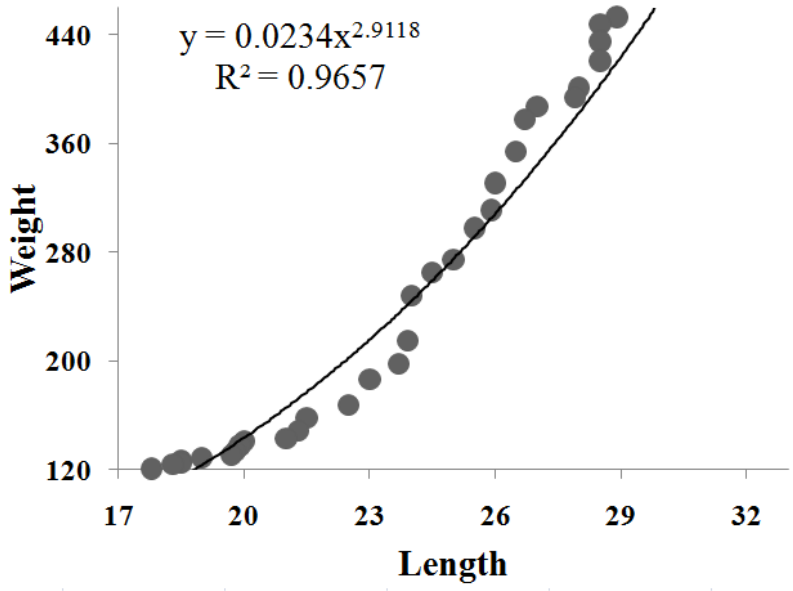

Fig. 2. Length-weight relationship of *Mugil cephalus* (Linnaeus, 1758) from Bandar Abbas Port in northeastern Persian Gulf

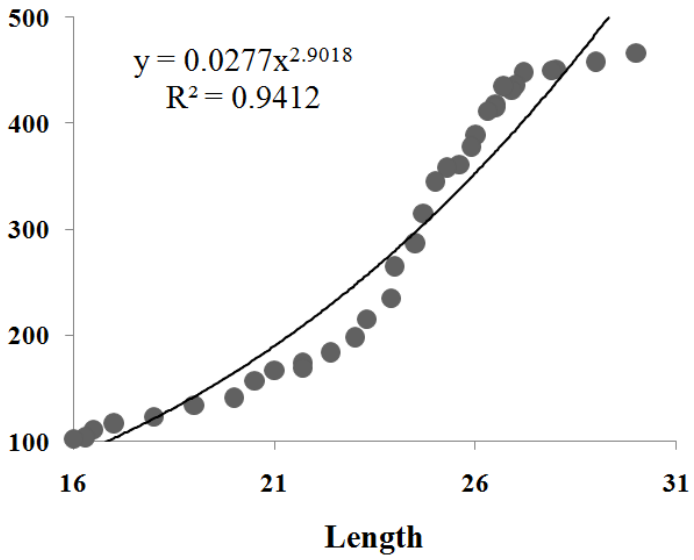

Fig 3. Length-weight relationship of *Mugil cephalus* (Linnaeus, 1758) from Qeshm Island in northeastern Persian Gulf

CONCLUSION

The obtained results contribute to the knowledge about the length-weight of *Mugil cephalus* (Linnaeus, 1758) from Bandar Abbas Port and Qeshm Island in northeastern Persian Gulf showing isometric and satisfactory growth, instead the length-weight of this species.

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