



Length-weight relationship and condition factor of *Hemiculter leucisculus* (Basilewsky, 1855), in Anzali Wetland of Iran

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ABSTRACT

The weight-length relationship and the condition factor have got significant role in fishery management. This study was conducted to determine length-weight relationship and Fulton's condition factor (K) for *Hemiculter leucisculus* in Anzali Wetland of Iran. For this purpose, 85 specimens of Sawbelly were caught from Anzali Wetland on September, 2014 using electrofishing. Fish were fixed in 4% Formalin and transported to the laboratory. Fish were digitally weighted at 0.1 g and the total length and Standard length were obtained using ImageJ software. The total lengths of the sampled fish ranged between 8.6 cm and 16.6 cm, with corresponding standard lengths of 7.8 cm minimum and 14.4 cm maximum. Fish weights ranged between 9 g and 77.04 g. The parameter b was 3.21 in Anzali Wetland. Also, the correlation coefficient (r^2) was calculated from the data to be equal to 0.98. Also, Mean condition factor of fish was found to be 1.01. The results of this study can be useful for biologists and fishery managers. Key words: Length-Weight relationship, Condition Factor, *Hemiculter leucisculus*, Anzali Wetland.

INTRODUCTION

Length-weight relationship (LWR) is of great importance in fishery assessments [1]. Length and weight measurements in conjunction with age data can give information on the stock composition, age at maturity, life span, mortality, growth and production [2, 3]. Information on length-weight relationship is essential for studies on growth and sexual maturity of animals [4]. Fulton condition factor (K) is widely used in fisheries and fish biology studies. This factor is calculated from the relationship between the weight of a fish and its length [5]. Thus, weight-length relationship and Condition factor are important tools in fish biology, physiology, ecology, fisheries assessment, and conservation [6, 7].

The sharpbelly, *Hemiculter leucisculus*, or common sawbelly is a tropical freshwater and brackish water fish belonging to Cyprinidae family [8, 9]. It found in rivers, lakes, small ponds and swamps but little appears to be known about its habitat requirements [8]. sawbelly originates in large streams and reservoirs in China, Japan, Hong Kong, Korea and the Amur River basin. The main bulk of the diet includes zooplankton, insects, crustaceans, algae and detritus [9]. Several countries report adverse ecological impact after introduction [9, 11]. *H. leucisculus* is reported from the Zarivar Lake [12], Sefidroud River, Anzali wetland and Wetlands includes Alma-Gol, Adji-Gol and Ala-Gol [13, 14]. This species has become established as an exotic species in Iran [9], but there is little information on its Weight-length and no information about Length-length relationship or condition factor. Therefore the

aim of the present study is to assess growth patterns and condition factors of *H. leucisculus* in Anzali Wetland of Iran.

MATERIALS AND METHODS

A total of 85 specimens were collected from Anzali Wetland (41°46'N, 39°35'E) in Iran on September, 2014 using electrofishing. The collected specimens were preserved in 10% formalin solution. Fish were digitally weighted at 0.1g and the total length and Standard length were obtained using ImageJ software. Linear regression was used to estimate the relationship between total length and body weight from $\log W = aL^b$ [15], Where W is the whole body weight (gr), L is the total length (cm), a is the intercept of the regression and b is the regression coefficient (slope). The condition factor (k) was calculated by the formula: $K = 100 W/L^b$, Where W = Weight (gr), L = Total Length (cm) and b = Regression co-efficient [5].

RESULTS

The total lengths of the sampled fish ranged between 8.6 cm and 16.6 cm, with corresponding standard lengths of 7.8 cm minimum and 14.4 cm maximum. Fish weights ranged between 9 g and 77.04 g. The length-weight relationship is expressed in the regression equation: $W = aL^b$. The parameter b was 3.21 in Anzali Wetland. Also, the correlation coefficient (r^2) was calculated from the data to be equal to 0.98, suggesting that the two variables, weight and length are highly correlated. This results is showed in figure 1.

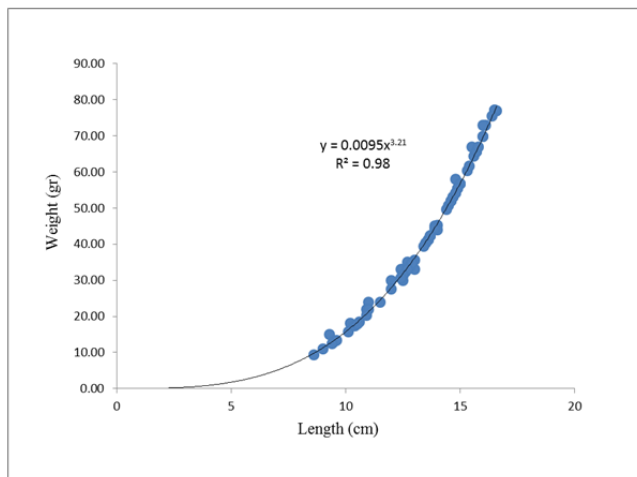


Figure 1. Length-weight relationship curve of *H. leucisculus* in Anzali Wetland

DISCUSSION

The weight-length relationship and the condition factor have got significant role in fishery management [6]. Length-weight relationship of fish varies depending upon the condition of life in aquatic environment [16]. The length-weight relationship of fish has significant importance in studying the growth, gonadal development and general well-being of fish population [17, 18]. The differences in weight as observed in this study could be due to individual condition factor which is the wellbeing and degree of fatness of an animal [19]. Hile [15] opined that the value of *b* may range between 2.5 and 4.0. In the present study, the parameter *b* was 2.99 in Anzali Wetland. Esmaili *et al* [20] also presented length-weight relationships for *H. leucisculus* from Caspian Sea. In this study, the *b* parameter was 3.54 and correlation coefficient (r^2) was 0.99. LeCren [21] pointed out that the variation in 'b' value is due to environmental factors, season, food availability, sex, life stage and other physiological factors. The *b* parameter of the length-weight relationships of fishes are affected by a number of factors, including sex, gonad maturity, habitat, and environmental conditions [5, 22]. In the present study, mean condition factor of fish was found to be 1.01. Condition factors were calculated for each length class separately. The condition factor (*K*) is an indicator of general well-being of the fish. *K* greater than one, is indicative of the general well-being of fish, whereas its value less than one, indicates that fish is not in a good condition [21, 23]. This factor is a measure of various ecological and biological factors such as degree of fitness, gonad development and the suitability of the environment with regard to the feeding condition [24]. In studies of population dynamics high condition factor values indicates favorable environmental conditions (such as: habitat and prey availability) and low values indicate less favorable environmental conditions [25].

CONCLUSION

This study has provided useful information on LWRs and 'K' for *Hemiculter leucisculus* in Anzali Wetland. The results obtained from this study are useful to fisheries scientist in Iran.

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