Length-Weight Relationships of *Silurus triostegus* (Heckel, 1843) from Shadegan Wetland in Khuzestan Province (Iran)

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Abstract: Length-weight relationships were derived for *Silurus triostegus* (Heckel, 1843) from Shadegan Wetland in Khuzestan Province of Iran from November 2008 to October 2009. fish were collected by fishermen using cast net or gill nets with 45 mm mesh. Total length and weight ranged from 119 to 650 mm and from 75 to 2000 g respectively.The relationship between total length (TL) and total weight (TW) was determined according to the power regression model. We determined a isometric power length-weight relationship as: $W = 0.06 \times L^{2.62}$ ($r2 = 0.888$ $n = 84$) and $W = 0.02 \times L^{2.79}$ ($r2 = 0.889$, $n = 218$) for male and female respectively. The b value in the length-weight relationship didn't differ significantly between males and females (t-test, $P > 0.05$).

Key words: *Silurus triostegus* · Length-Weight Relationships · Shadegan Wetland · Khuzestan Province

INTRODUCTION

Shadegan Wetland in Khuzestan province is one of the 18 international wetlands registered on UNESCO's Natural Heritage List. Located 52 km from Abadan and 105 km from Ahvaz, it is Iran's largest wetland and by Linking Jarahi River connect with Persian Gulf waters, the wetland is considered one of the most wonderful natural landscape of the world because of it is unique biodiversity [1].

Silurus triostegus was first described by Heckel (1843) from the Tigris River. The presence of these organisms often becomes evident after a massive development, causing clinical signs or leading to mortality of infested hosts. More than 250 species of the trichodinid ciliates are recognized as parasite or symbiont on freshwater and marine fish or other organisms. The genus *Trichodina* is the largest of this family. About 200 species of *Trichodina* have been described from fish by silver impregnation technique [2].

The relationship between body weight and length is simple but essential in fishery management [3]. Length-weight relationships drastically help scientists to convert growth-in-length equations to growth in weight in stock assessment models [4], to estimating growth rates, age structure, to obtain the condition of fish and comparative growth studies [5-7] to estimate biomass from length frequency data.

The present study describes the length-weight relationships of *Silurus triostegus* (Heckel, 1843) from Shadegan Wetland in Khuzestan Province (Iran).

MATERIALS AND METHODS

Study Area: Shadegan wetland (Iran) is a wetland in the south-west of Iran in Khuzestan province. Where the seventh station of season sampling in Shadegan wetland (Iran) were selected that included Sarakhieh, Mahshahr, Khorosy, Kanal, Rogbe, Ateish and Abadan (Fig. 1).

Methods: A total of 496 fresh specimens of *S. triostegus* were collected from Shadegan wetland (Iran), from November 2008 to October 2009. Fish were collected by fishermen using cast net or gill nets with 45 mm mesh and then transported to laboratory with dry ice., In the laboratory, For each specimen, total length (TL), whole body wet weight (g) and sex was recorded. The length-weight relationship was estimated by using following equation:

$$W = a L^b$$

Where W is the whole body weight (g), L is the total length (mm), a is the intercept of the regression and b is the regression coefficient (slope) [8].

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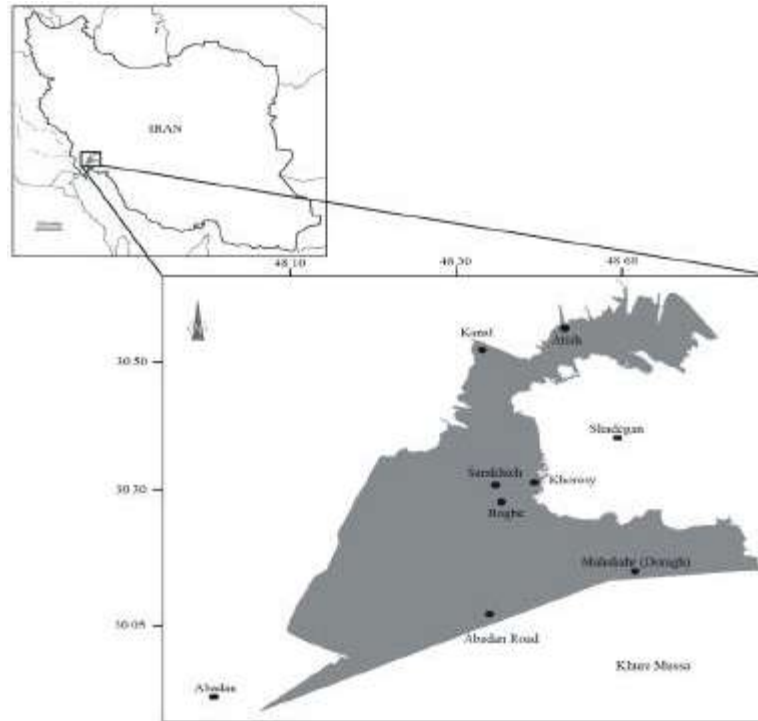
Fig. 1: The map of Iran, Location of Seven Capture sites was sampled in Shadegan wetland (Khuzestan province, South West of Iran)

A t-test was used for comparison b value in the power regression of male and female fishes [9].

The growth pattern (t) was using the following equation: [10]

$$t = \frac{sd \ln L}{sd \ln W} * \frac{|b-3|}{\sqrt{1-r^2}} * \sqrt{n-2}$$

Where Sdln L is Standard deviation of the length natural logarithm (cm), SdlnW is Standard deviation of the natural logarithm weight (g), b is Curve slope of the relationship between length and weight, r2 is Regression coefficient between length and weight and n is number of samples.

Statistical Analysis: Data were transferred to Microsoft Excel spreadsheet for analysis. SPSS 16.0 statistical software was used for ANOVA and Student's t-test analysis; differences were considered significant at values of p<0.05.

RESULTS AND DISCUSSION

Overall 496 fish were measured. The sample size, the minimum, maximum and mean length and weight (± STD), are presented in Table 1.

In present, the mean, maximum and minimum total lengths were 295.17±88.62, 650 mm and 119 mm respectively (Table 1). Bozkurt and Unlu [11], reported the mean, maximum and minimum total lengths of *Silurus triostegus* (Heckel, 1843), 336±49.3, 250 mm and 405 mm respectively.

Alp *et al.* [12] reported the total length of the *Silurus glanis* in a Turkish Reservoir ranged from 30.9 cm (220 g) to 148.1 cm (24.260 g) for females and from 38.5 cm (330 g) to 187.0 cm (42,500 g) for males. The mean size of female and male individuals reported 92.7±23.4 cm (6578.2±4964.1 g) and 101.8±29.2 cm (9041.1±7868.9 g) respectively.

Karadedea *et al.* [13] reported the mean total lengths and total weight of *Silurus triostegus*, from the Ataturk Dam Lake, 303±85.70 mm and 316±238.98g respectively.

For both sexes of all individuals, the relationship between total length and total weight was described as: $W = 0.02 \, TL^{2.79}$ ($r2 = 0.889$, $n = 218$); for females: $W = 0.06 \, TL^{2.62}$ ($r2 = 0.888$, $n = 84$); and for males: $W = 0.05 \, TL^{2.67}$ ($r2 = 0.89$, $n = 496$) (Fig. 2). The b value in the length-weight relationship didn't differ significantly between males and females (t-test, P>0.05).

Alp *et al.* [12] described Length-weight relationship of *Silurus glanis* in a Turkish Reservoir, $W = 0.0104 \, TL^{2.9133}$ ($n = 110$; $r2 = 0.9664$; $p\backslash 0.0001$) for males and $W = 0.0038 \, TL^{3.1295}$ ($n = 135$; $r2 = 0.9845$; $p\backslash 0.0001$) for females.

Table 1: Length (mm) and weight characteristics (g) of *Silurus triostegus* (Heckel, 1843) from Shadegan Wetland in Khuzestan Province (Iran)

Sex	Length characteristics (mm)				Weight characteristics (g)		
	n	min	max	Mean ± STD	min	max	Mean ± STD
Males	84	185	600	364.38±97.54	75	1450	409.95±323.05
Females	218	210	650	327.22±81.58	79	2000	315.67±276.36
Immature	194	119	610	232.33±44.23	190	580	109.43± 58.14
Total	496	119	650	295.17±88.62	75	2000	248.41±176.39

Male
$y = 6E\text{-}05x^{2.626}$
$R^2 = 0.8882$

Female
$y = 2E\text{-}05x^{2.7987}$
$R^2 = 0.8898$

Immature
$y = 0.0002x^{2.3875}$
$R^2 = 0.6584$

Total
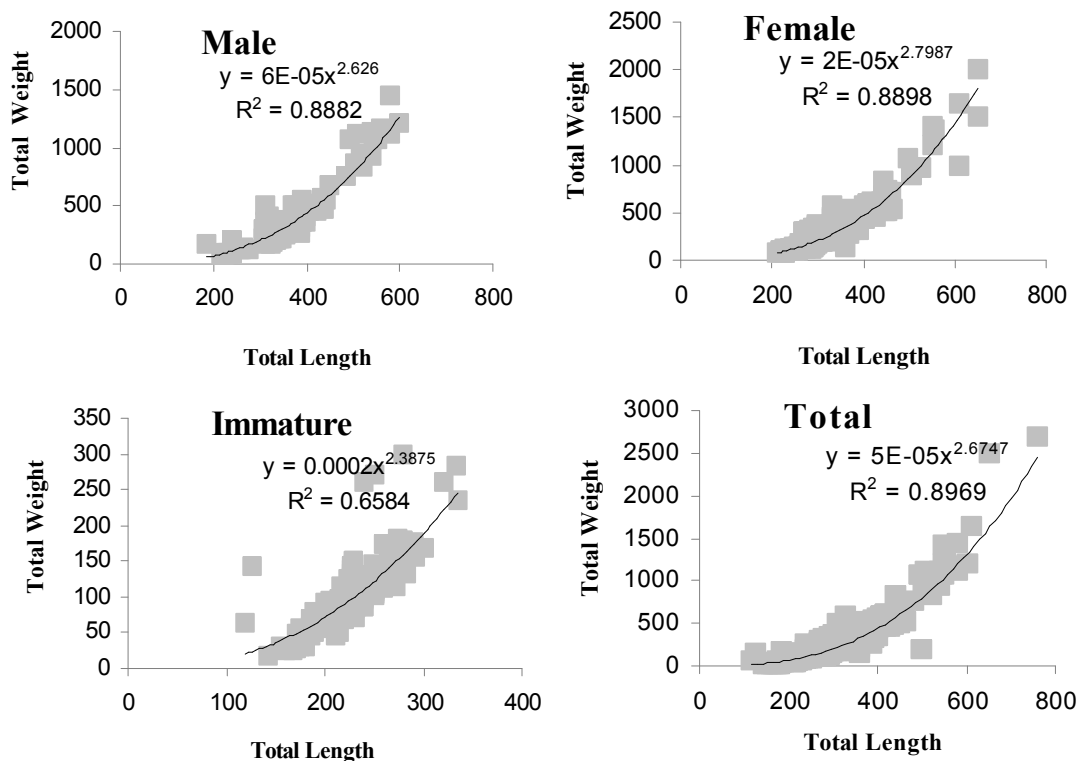$y = 5E\text{-}05x^{2.6747}$
$R^2 = 0.8969$

Fig. 2: Length-weight relationship of *Silurus triostegus* (Heckel, 1843) from Shadegan Wetland in Khuzestan Province (Iran)

We determined a negative allometry power length-weight relationship for average total species, females and males.

According to Weatherley and Gill [14] the annual length-weight relationships could differ between seasons and years and many factors could contribute to these differences namely, maturity, temperature, salinity, food availability and size. Length-weight relationship may vary seasonally according to the degree of sexual maturity sex, diet, stomach fullness, sample preservation techniques [15], number of specimens examined, area/season effects and sampling duration.

This study gives information to fishery biologists about total weight relationships for *Silurus triostegus* (Heckel, 1843) from Shadegan Wetland in Khuzestan Province (Iran)

ACKNOWLEDGEMENTS

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