Length-Weight Relationship of two Fish Species *Schizothorax zarudnyi* and *Schizocypris altidorsalis* (Cyprinidae) from the Sistan Basin, Iran

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Abstract: In present study, length-weight relationships are described for 2 important fish species that are native and economic in the Sistan basin (south eastern of Iran): Snow trout *(Schizothorax zarudnyi*) and snow trout (*Schizocypris altidorsalis*). Samples were collected with gill nets from Chahnimeh reservoirs. The sample size ranged from 134 individuals for *Schizothorax zarudnyi* to 204 for *Schizocypris altidorsalis*. Linear regression equations were obtained. The dataset has shown appropriateness which follows allometric growth.

Key words: Length-weight relationships, Snow trouts, Sistan, Iran

1- Introduction:

The study of the length –weight relationship (LWR) of fishes forms important aspects of fishery biology. One important aspect of the growth of a fish is the relationship between length and weight of its body. The statistical relationship between these two parameters helps in the identification of the analysis of the catches and breeding season. The analysis of these two parameters has usually been directed towards two different objectives, primarily towards describing mathematically the relationship between length and weight so that the expected weight for length of individual fish or the relevant group of individuals (Beyer, 1987). In addition, the data on length and weight can also be used to compare fish life history between regions in species and populations (Bayhan, 2008). This study reports the LWR of *Schizothorax zarudnyi* and *Schizocypris altidorsalis* of Sistan basin, Iran. The Sistan basin is a densely populated enclave in the south-eastern part of Iran at the lower end of the Hirmand River. This basin includes water resources such as Hamoun lakes and Chahnimeh reserevoirs. Four reservoirs (Chahnimeh) have been constructed for public and irrigation water supply (Van Beek *et al*., 2008). The Chahnimeh particularly represents a large nursery for several fish species and considered as an extremely vital fishing zone.

2-Materials and methods:

Samples were collected from the Chahnimeh reservoirs (Sistan, Iran) using gill net from January 2011 to December 2011. During the course of the study, 338 individuals of two species representing the family Cyprinidae were captured. Total length of each fish were measured to the nearest 0.1 cm, using a measuring rule, and individuals were weighed on a digital balance with a precision of 0.1 g;

sex was recorded when possible for the fish species of the sample collected.

The relationship between the length (L) and the weight (W) of fish can generally be expressed by the equation:

$$W = aL^b$$

Where "a" is a factor discussed below and the exponent "b" lies between 2.5 and 3.5 (usually close to 3). Carlander (1969, 1977) has demonstrated from an extraordinarily large number of length–weight data, derived from a wide variety of fishes, that values of b < 2.5 or b > 3.5 are generally based on a very small range of sizes and/or that such values of b are most likely erroneous. When b=3, weight growth is called *isometric*, meaning that it proceeds in the "same" dimension as the cube of length (L^3). When b #3, weight growth is *allometric*, meaning that it proceeds in a "different" dimension (differing from L^3). Allometric growth can be either positive (b>3) or negative (b<3).

Table 1. Descriptive statistics and estimated parameters of length-weight relationship for two fish species caught gill net in the Chahnimeh reservoirs (Sistan, Iran)

			Length (cm)	Weight (g)	$W=aL^b$		
Species	Sex	N	Min-Max	Min-Max	a	b	r^2
Schizothorax zarudnyi	♀	70	42-63	880-3000	0.0259	2.7869	0.839
	♂	64	29-49	305-1170	0.0647	2.5137	0.8886
Schizocypris altidorsalis	♀	69	12.5-23.9	16.04-91.14	0.1304	2.0568	0.9154
	♂	49	12.1-22	20.79-85.76	0.0542	2.371	0.8697
	Both	86	10.2-25.1	10.14-101.4	0.0395	2.5047	0.8603

Statistical analysis, including regression analysis and calculation of correlation was carried out by Microsoft EXCEL.

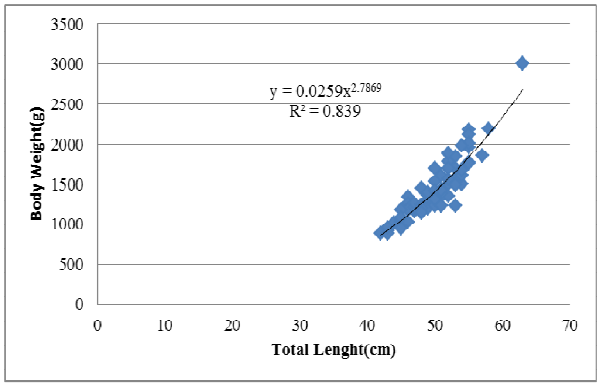

Fig. 1. Relationship between total length (cm) and wet body weight (g) in Snow trout (*Schizothorax zarudnyi* ♀).

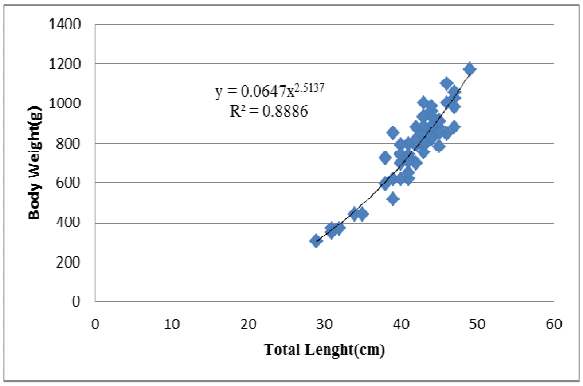

Fig. 2. Relationship between total length (cm) and wet body weight (g) in Snow trout (*Schizothorax zarudnyi* ♂).

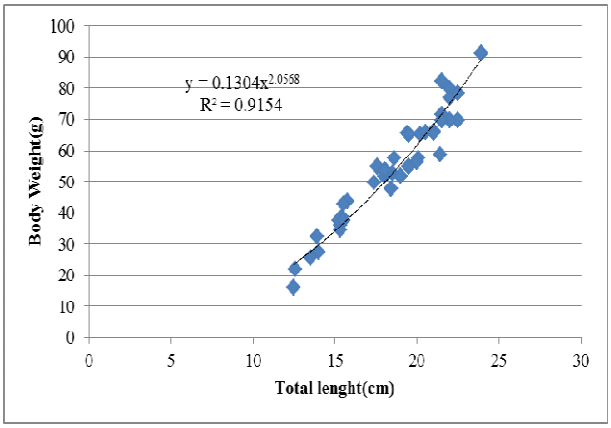

Fig. 3. Relationship between total length (cm) and wet body weight (g) in Snow trout (*Schizocypris altidorsalis* ♀).

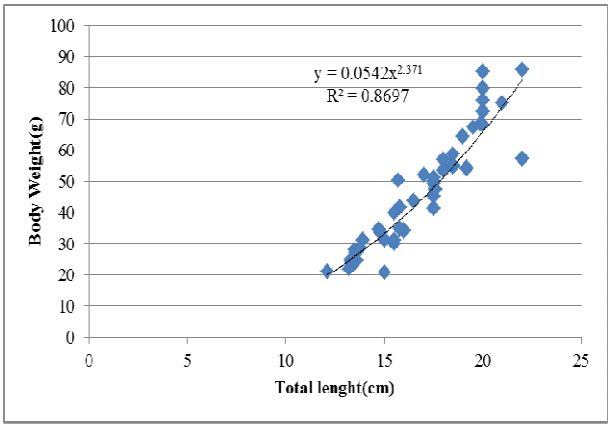

Fig. 4. Relationship between total length (cm) and wet body weight (g) in Snow trout (*Schizocypris altidorsalis* ♂).

3-Results and discussion:

Totally 338 specimens were weighed and measured to estimate length-weight relationships. The sample size ranged from 134 individuals for *Schizothorax zarudnyi*, to 204 for *Schizocypris altidorsalis*. The coefficient "b" was 2.7869 and 2.5137 for females and males samples of *Schizothorax zarudnyi*, respectively. Also, the coefficient "b" was 2.0568 and 2.371 for females and males samples of *Schizocypris altidorsalis*, respectively. Concerning the type of growth, negative allometric growth was observed for both species. Even though the change of b values depends primarily on the shape and fatness of the species, various factors may be responsible for the differences in parameters of the length-weight relationships among seasons and years, such as temperature, salinity, food (quantity, quality and size), sex and time of year and stage of maturity (Sparre, 1992), which were not accounted for in the present study. These low values of "b" could be ascribed to one or a combination of most of the factors mentioned above.

The information obtained from the present study is useful for biologists and fishery scientists subjected to recovery programs, or management and conversation activities.

4-References:

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