Length-Weight Relationship of *Barbus grypus* (Heckel, 1843) in Dalaki River and *Garra rufa* (Heckel, 1843) in Shahpur River in South of Iran

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Abstract: Length-weight relationships were derived for *Barbus grypus* (Heckel, 1843) in Dalaki River and *Garra rufa* (Heckel, 1843) in Shahpur River in south of Iran. The sampling was carried out at monthly intervals between April to August of 2012. A total fish 109 samples collected (57 *Barbus grypus* of Dalaki River and 52 *Garra rufa* of Shahpur River). The relationship between total length and weight was for *Barbus grypus* (Heckel, 1843) in Dalaki River \( W = 0.02 L \) \((R^2 = 0.970, n=57)\) and for *Garra rufa* (Heckel, 1843) Shahpur River \( W = 0.012 L \) \((R^2 = 0.981, n=52)\). The parameter \( b \) for *Barbus grypus* was 2.93 and for *Garra rufa* was 3.242. We determined a negative allometry \((b<3)\) length-weight relationship for *Barbus grypus* in Dalaki river and positive allometry \((b>3)\) length-weight relationship for *Garra rufa* (Heckel, 1843) in Shahpur river.

Key words: *Barbus grypus* • *Garra rufa* • Length-Weight Relationship • Shahpur River

INTRODUCTION

Shirbut, *Barbus grypus* (Heckel, 1843) is a large cyprinid, which occurs along the Euphrates and the Persian Gulf are found in Khuzestan plain Tigris Rivers in Iran, Turkey, Syria and Iraq [1]. Basin in the Gulf can be the salty rivers, Shahpur, Dalaki and the Karun River in Khuzestan Dam pointed out. They are usually everything eater. Of algae, moss and high parts of plants can be fed. *Garra Rufa* a fish species from the Cyprinid family. The *Garra rufa* as well as another cyprinid fish *Cyprinion macrostomum* have been identified as Doctor Fish because of their medical treatment [2].

The distribution areas of this cyprinid fish were reported as Turkey and Iraq and Iran such as Karoun, Shahpur and Persian Gulf drainages [3-5]. Ecologically, this species can be found on the streams and rivers bed and also on under gravels and pebbles where they adhere to submerged rocks and stones with its adhesive apparatus located beneath the mouth opening.

The relationship between body weight and length is a simple but essential in fishery management [6]. Length-weight relationships drastically help scientists to convert growth-in-length equations to growth in weight in stock assessment models [7]. To estimating growth rates, age structure, to obtain the condition of fish and comparative growth studies [8-10]. In addition, these relationships contribute to the comparison of life history and morphological aspects of populations between different regions of the same country.

The present study describes the length-weigh relationship of *Barbus grypus* (Heckel, 1843) in Dalaki River and *Garra rufa* (Heckel, 1843) in Shahpur River in south of Iran.

MATERIYALS AND METHODS

The sampling was carried out at monthly intervals between April to August of 2012. A total fish 109 samples collected (57 *Barbus grypus* of Dalaki River and 52 *Garra rufa* of Shahpur River).

Dalaki River near Dashtestan city (latitude: 29°28’ and longitude: 51°17’). The length of Dalaki River in the province Bushehr has 115 kilometers. This River is a permanent river with average depth of 70 cm and bed mud [11].
Shahpur River near Kazerun city (latitude: 29°19’ 30” and longitude: 50°55’). The length of Shahpur River in the province Fars has 262 kilometers.

Sampled fishes were fixed with 10% formalin and transferred to the laboratory. Fishes were caught by means of scoop net with mesh size 1.5 mm (bar). For each specimen, total length (TL), whole body wet weight (g) 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) [12]. The parameters \( a \) and \( b \) of the length-weight relationship was estimated by the least-squares method based on logarithms [13]:

\[ \log (W) = \log (a) + b \log (L) \]

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 \( b < 3 \)). This parameters \( (a, b) \) are important in stock assessment studies [14]. Data analysis was done by Excel and SPSS 19 software.

**RESULTS AND DISCUSSION**

Overall 109 fish were measured. The sample size, the minimum, maximum and mean length and weight (±STD) of *Barbus grypus* (Heckel, 1843) in Dalaki River are presented in Table 1. And the sample size, the minimum, maximum and mean length and weight (±STD) of *Garra rufa* (Heckel, 1843) in Shahpur River are presented in Table 2.

Relationship between length-weight of *Barbus grypus* in Dalaki River is presented in Figure 1 and Table 3. And relationship between length-weight of *Garra rufa* in the Shahpur River is presented in Figure 2 and Table 3.

A total 109 fish were measured. The minimum and maximum length of *Barbus grypus* (Heckel, 1843) in Dalaki River was respectively 6.6 and 37.8 (cm) and minimum and maximum weight was respectively 7.04 and 720 (g) (Table 1). The minimum and maximum length of *Garra rufa* (Heckel, 1843) in Shahpur River was respectively 3.2 and 13.7 (cm) and minimum and maximum weight in this river was 0.44 and 55.96 (g) (Table 2).

### Table 1: Length characteristics (cm) and weight characteristics (g) of *Barbus grypus* in the Dalaki River, Bushehr, Iran

<table>
<thead>
<tr>
<th></th>
<th>Min.</th>
<th>Max.</th>
<th>Mean ± STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>6.6</td>
<td>37.8</td>
<td>20.3±7.52</td>
</tr>
<tr>
<td>Weight</td>
<td>7.04</td>
<td>720</td>
<td>194.0±211.288</td>
</tr>
</tbody>
</table>

### Table 2: Length characteristics (cm) and weight characteristics (g) of *Garra rufa* in the Shahpur River, Fars, Iran

<table>
<thead>
<tr>
<th></th>
<th>Min.</th>
<th>Max.</th>
<th>Mean ± STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>3.2</td>
<td>13.7</td>
<td>10.33±1.89</td>
</tr>
<tr>
<td>Weight</td>
<td>0.44</td>
<td>55.96</td>
<td>26.316±10.74</td>
</tr>
</tbody>
</table>

### Table 3: Length-weight relationship of *Barbus grypus* (Heckel, 1843) in Dalaki River and *Garra rufa* (Heckel, 1843) in Shahpur River

<table>
<thead>
<tr>
<th></th>
<th>( n )</th>
<th>( a )</th>
<th>( b )</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Barbus grypus</em></td>
<td>57</td>
<td>0.02</td>
<td>2.93</td>
<td>0.970</td>
</tr>
<tr>
<td><em>Garra rufa</em></td>
<td>52</td>
<td>0.012</td>
<td>3.242</td>
<td>0.981</td>
</tr>
</tbody>
</table>

Fig. 1: Length-weight relationship of *Barbus grypus* (Heckel, 1843) in Dalaki River, Bushehr, in south of Iran

Fig. 2: Length-weight relationship of *Garra rufa* (Heckel, 1843) in the Shahpur River, Fars, Iran
grypus in Dalaki River and positive allometry \((b>3)\) length-weight relationship for Garra rufa (Heckel, 1843) in Shahpur River.

**CONCLUSION**

Although there is little information about biological characteristics of \(C.c.intermedia\) of Iranian waters, present study provides basic information for fishery biologists and managers in this region.

**ACKNOWLEDGMENTS**

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**REFERENCES**